Radio Communication

January 1988

1·9·1·3 1·9·8·8

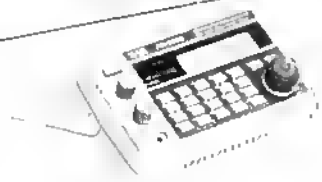
No, I'm not late... I'm on a special delivery from AMCOMM... for £25!! *


FT 757


AL 84


IC 735


IC 761


AR 2002

Yes . . . £25 — that's all the initial payment you need, to take delivery of the latest state-of-the-art transceiver, receiver or many other selected items from our stock. **A simple method of payment devised to make it easier to buy** — which will cost you less than any other credit deal known to us. Try AMCOMM's painless payless credit. It's specifically designed to help you where it hurts. **For a mere £25 down payment** and subject to status you can walk away with the rig you've been drooling over all year. Santa hasn't forgotten you — neither has AMCOMM!

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The Staff of AMCOMM
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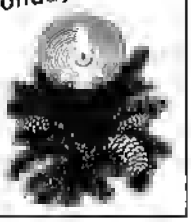
TLX: 24263



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Radio Communication

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Fax 0707 45105

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RSGB on Prestel page 8107

FRONT COVER
THE FOUNDERS

Standing (l to r): L F Fogarty, FKX, hon treasurer, 1913-23; L McMichael, vice-President, MXA, 2FG, hon secretary 1921-2; F Hope-Jones, chairman of the committee. Seated: R Klein, RKX, 2HT, G8NK.

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

36,527 copies per issue average circulation in 1986

CONTENTS

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the RSGB in consideration of the above-mentioned payment by the RSGB to the contributor.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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Closing date for contributions unless otherwise notified: five weeks before publication date

The TS-140S from Kenwood

Every once in a while, something comes along which marks a true turning point in amateur radio equipment. Such was the case when Trio-Kenwood introduced the TS120 series; the first of the small solid state transceivers to appear.

Following the trends of the last few years towards more "sophisticated" equipment (really meaning more and more complicated), we have seen Kenwood engineering directed more towards better performance, particularly in HF transceivers; performance which has become a standard of excellence for others to try to match.

Study of recent reviews of equipment which has been introduced to try to match Kenwood's TS940S reveals just how far behind some manufacturers have fallen; I am reminded of some lines from Kipling which run (more or less):- "They stole everything I had, but they couldn't steal my mind, So I left them sweating and stealing, a year and a half behind."

Well, the chaps at Kenwood have not been asleep, and they have come up with a new transceiver which I believe will mark another turning point in HF equipment. This is the TS140S, and I can tell you that from a short "hands-on" session which I was given in Germany recently, I am certain that the TS140S will satisfy many many users.

The new TS140S is about the same size as the TS430 or TS440, and on the face of it is similar (yawn) to other transceivers of the genre in that it gives you 100 Watts of RF on all the amateur bands, in all modes including FM; has a general coverage receiver covering 500 kHz to 30 MHz; and has loads of facilities that you might expect – BUT – Kenwood have studied what the radio amateur has been saying and have refined and simplified the operation of the TS140S to make it a real dream to use.

Not only that, they have given the user a receiver section with real performance which matches today's expectations, and remember that Kenwood have consistently set the standards for the last few years.

It is almost impossible for any manufacturer to give every potential customer everything that the customer wants, but there is little doubt that many people have been asking for "simplicity". However, it is also possible to carry the "simplicity" concept too far, resulting in a transceiver which is certainly low priced but lacks facilities which many users see as essential, I happen to believe that Kenwood have achieved the right balance in the TS140S. It will be interesting to see what you, the users think.

Obviously it is impossible to describe all the features and facilities of the TS140S in a few paragraphs, so why not drop us a line and ask for complete information. What's that? Oh, the price. Not yet finally determined, but quite a bit less than £950 but not quite as low as the £750 we have been asking for the TS530S and TS430S in recent weeks.

In my opinion, the TS140S in combining performance with simplicity at an attractive cost will give real satisfaction to the radio amateur who wants to enjoy his hobby of communicating, rather than counting the buttons on the front panel. And who am I to make this pronouncement? Well, I'm John Wilson and I am one of the original gang of three which became Lowe Electronics Ltd. I haven't written for the magazines for years, but the TS140S really attracted me so I thought I should tell you about it rather than bore you with a specification. Hope you like it too. 73.
G3PCY/5N2AAC

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone 0629 580800 (4 lines)

station accessories

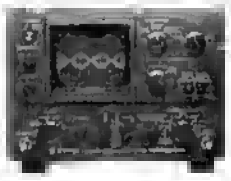
TL922 HF amateur band linear amplifier

The TL922 is a class AB2 grounded grid linear amplifier using two high performance EIMAC 3-500Z tubes. It covers 160 to 10 metres for SSB, CW and RTTY modes of operation. Engineering perfection, those who have seen a TL922 will know what I mean. It is one of the few items of amateur radio equipment which is truly hand built by a specialist engineer.

TL922 inc tubes... £1495.00 inc VAT, carriage £8.00

SM220 station monitor

Based on a wide frequency range oscilloscope, the SM220 station monitor features in combination with a built-in two-tone generator, a wide variety of waveform observing capabilities. The SM220 aids efficient station operation as it monitors transmitted waveforms and it also serves as a sensitive wide frequency range oscilloscope for various adjustments and experiments. When fitted with the optional BS8 panoramic display and connected to one of the following transceivers (TS940, TS830, TS180, TS820 series) signal conditions in the vicinity of the receive frequency can be seen over a 40 or 200KHz range.



SM220...£343.36 inc VAT, carriage £8.00
BS8...£77.00 inc VAT, carriage £1.50

TR-751E

Amazing – we haven't mentioned Kenwood's most popular transceiver for about a year. Maybe it's because it sells so well on it's reputation, but that's no reason for keeping it off the pages of RadCom.

What is Kenwood's most popular transceiver? It's the TR751E (fanfare of muted trumpets). The TR751E is THE definitive 2 metre multimode, and carries on the tradition started by the TR9000 many years ago and maintained by the TR9130.

If you want a rig that does it all, the TR751E is it. Full 2 metre coverage, 25 watts, super receiver, use as a mobile or base station, it's all there. I'll make my usual comment that in order to appreciate all it can do, you should see a fully descriptive brochure, and that's available for the cost of a first class stamp. Better still, if you send us £1, we will return the full Kenwood colour catalogue together with all sorts of other useful readinag.

Finally, for those who actually read the advertising, we have a new pair of micro handheld transceivers from Kenwood. Just ask.

TR-751E...£599.00 inc VAT, carriage £8.00

send for the KENWOOD detailed leaflet

amateur band plus general coverage transceivers

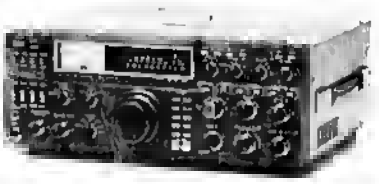
TS940S HF transceiver with general coverage receiver.

Top of the range, the TS940S has every operating feature that the discerning HF operator needs. Amateur bands from 160 to 10 metres plus a general coverage receiver tuning from 150 kHz to 30 MHz. Modes of operation are USB, LSB, CS, AM, FSK and FM. Forty memory channels, each effectively a separate VFO and easy keyboard frequency entry make operation and ownership of the TS940S a pleasure.

TS940S...£1995.00 inc VAT, carriage £8.00

TS930S HF transceiver with general coverage receiver

Much has been said and written about the TS930S and it now has a place high in the affection of radio amateurs. Modes of operation are USB, LSB, CW, AM and FSK. Providing full coverage of the amateur bands from 160 to 10 metres and including a general coverage receiver tuning from 150 kHz to 30 MHz, the KENWOOD TS930S is the ideal rig for today's crowded bands.



TS930S...£1695.00 inc VAT, carriage £8.00

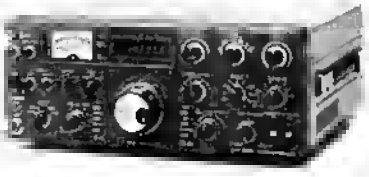
TS440S HF transceiver with general coverage receiver

A step forward in compact HF equipment, the TS440S covers the amateur bands from 160 to 10 metres and is also a general coverage receiver tuning from 100 kHz to 30 MHz. It has keyboard frequency entry, full and semi break-in on CW, one hundred memories and provision for fitting an internal ATU. Modes of operation are USB, LSB, AM, FM and AFSK.

TS440S...£1138.81 inc VAT, carriage £8.00

TS830S HF amateur bands transceiver

Needing no description, the KENWOOD TS830S, which uses a pair of 6146B valves in the PA, is well known on the amateur bands (160 to 10 metres) for its superb signal quality. Modes of operation are USB, LSB and CW. Having variable bandwidth tuning, IF notch, IF shift and provision for various filters, its receive performance is excellent too. (As you might expect from KENWOOD).



TS830S...£1098.00 inc VAT, carriage £8.00

LOWE ELECTRONICS LTD.
Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone 0629 580800 (4 lines)

1300HC frequency counter.

Small enough to fit into a shirt pocket, the 1300HC frequency counter brings easy and accurate frequency measurement well within everyones reach.
The 1300HC uses a full 8 digit display, and measures to 1300 MHz, thus being ideal for amateur as well as all mobile radio bands including cellular.
The unit contains its own rechargeable NiCd batte. y pack which is charged from an external supply. The frequency counter can also be powered from any 9 to 12 volt dc supply, which charges the batteries as well.
The 1300HC has excellent sensitivity, and when used with the optional telescopic whip, easily measures transmitter frequencies of mobile or handheld transceivers, even low powered "bug" devices. When used in conjunction with a simple "dip oscillator", the 1300HC makes checking tuned circuit or aerial resonance an easy task.
The high performance of the 1300HC frequency counter makes it an indispensable tool for every amateur, engineer or technician. Its small size makes it suitable for either shack or "on the move" use.

Specification

Range	1-300 MHz
Resolution	100Hz at 2.5 sec. gate 1 kHz at 250 mS. gate
Display	8 digit 0.3" LED MHz decimal point Leading zero blanking
Gate times	Fast. 250 mS Slow. 2.5 S
Sensitivity (typical)	1-10 Mhz...10-150 mV rms 10-1000 Mhz...3-50 mV rms 1-1.3 GHz...10-150 mV rms
Accuracy (typical)	+/- 1ppm, +/- 1 count LSD
Aging	0.1 ppm/month (typical)
Gate indication	Red LED during sampling
Input connector	S N.C.
Input power	9 12 Vdc at 150 mA
Power connector	Concentric. Centre positive.
Case	Brushed anodised aluminium
Size	3.9H x 3.5W x 1D (inches)
Weight	255 g
Power supply	Internal NiCd pack. (supplied). or external dc source (option)

1300HC ...Handheld frequency counter
£135.00 inc vat, carr. £2.00

Options

PS12.....AC mains power supply
£8.50 inc vat, carr. £2.00
BNC8.....Telescopic whip
£7.48 inc vat, carr. £0.00
CC12.....Padded carrying case
£9.90 inc vat, carr. £1.00

packet radio from **KANTRONICS**

When I first heard of packet radio, I said "What?", and that is the reaction of many radio amateurs. However, I never expected it to be so much fun, and judging by the demand and the queue to get at our demonstration station here at Matlock, a lot of other people are also finding it truly fascinating.
There are several companies offering ready made packet systems, and the descriptions are usually full of terms you don't understand (including some of our own ads in the past). What for example is "enhanced generic command structure"? Sounds very much like something taught at Sandhurst or West Point. From the equipment available, we chose to represent Kantronics, because their units are sheer delight to see, to use, and to enjoy. For full information on this most interesting aspect of our hobby, just send a couple of first class stamps and ask for "Kantronics".
Prices range from £159 to £298, and I know I haven't told you what packet radio will do – the experts among you already know; if you are like me, a novice, why not send for the info...

DAIWA meters.

CN410M. . .3.5 to 150 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors. . .£61.72 inc vat, carriage £1.50.

CN460M. . .140 to 450 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors. . .£65.40 inc vat, carriage £1.50.

NS448 with remote head. . .900 to 1300 MHz, forward 5/60 W, reflected 1.6/6.6 W, N type connections. . .£86.60 inc vat, carriage £2.50.

NS660P with switchable meter reading (average, normal PEP and hold PEP) and provision for optional remote head (U66V), 1.8 to 150 MHz, forward 15/150/1500 W, SO239 connectors. . .£115.00 inc vat, carriage £2.50.

U66V remote head. 140/525 MHz, max 300 W, N type connectors. . .£55.27 inc vat, carriage £1.50.

SC20 extension cable for U66V, approx 20 metres long. . .£29.21 inc VAT, carriage £1.50.

LOWE SHOPS

Our Head Office is at Matlock, but we have conveniently placed branches around the country. Each branch is run by a manager who is an active radio amateur and also keen to help you. He normally stocks everything in our extensive range and can demonstrate all major items of radio equipment to you. Note though that all mail orders must be sent to Head Office at Matlock.

In Glasgow, at 4/5 Queen Margaret Rd.,
(off Queen Margaret Drive). Tel. 041 945 2626.

In Darlington, at 56 North Road. Tel. 0325 496121.

In Cambridge, at 162 High St., Chesterton. Tel. 0223 311230.

In Cardiff, at South Wales Carpets, Clifton St.
Tel. 0222 464154.

In London, at 223 Field End Rd., Eastcote, Middx.
Tel. 01 429 3256.

In Bournemouth, at 27 Cillam Rd., Northbourne.
Tel. 0202 577760.

Branches are normally open from Tuesday to Saturday inclusive, with lunch breaks to suit local conditions. If in doubt, just telephone your nearest branch.

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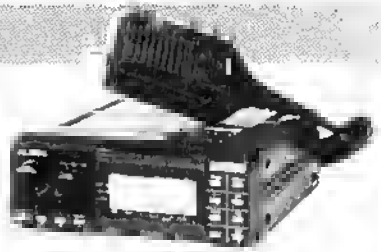
If you want to operate FM mobile on 2m & 70cm with full duplex using separate rigs, a typical costing would be as follows:

2m FM transceiver	£300.00
70cm FM transceiver	£350.00
2m/70cm duplexer	£26.00
Total Cost =	£686.00

ALINCO DUAL BANDER



★ 2M/70cms
★ 25 Watts
★ Full Duplex
★ Built-in Diplexer/Dual VFO
★ Small size/21 memories

£449!

ALD-24E

This transceiver could transform your operating habits! It contains completely separate 2m and 70cms transceivers, permitting full duplex operation. To the un-initiated, this means you can transmit on 2m whilst receiving on 70cms, or vice versa. The built-in duplexer means a single antenna socket with a full 25 watts output on both bands. Measuring only 55" x 2" x 65' it is the ideal mobile rig. Its comprehensive memory and scanning facilities provide rapid access to both simplex and repeater channels on 2m and 70cms.

2m ALR22E FM MOBILE

Opening offer price

★ 25 Watts FM
★ 21 Memories
★ RX 138-174 MHz (option)

£249

The new and exciting ALR-22E 2m mobile transceiver from ALINCO offers high performance, small size, and low cost in a single package. Measuring only 5.5" x 1.5" x 6.5" it provides a full 25 watts output with the usual facilities such as memories scanning, repeater operation etc. Plus a full 12 months warranty on parts and labour.

2M MICRO HANDHELD

★ 3 Watts FM
★ Memory Channel
★ Battery Save
★ Smallest in World

£199!

ALX-2

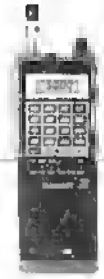
This new Micro Handheld for 2m from ALINCO offers 2 watts output in a package that will fit into almost any pocket. Features include thumbwheel frequency selection, high/lowpower, rx battery drain of 5ma on "battery save", 300mHz steps, 7.5kHz steps, larger 450mAh nicad pack, AC charger, helical antenna, carry strap, it even has dial illumination! Send today for full details.

2M HAND-HELD

★ 3/5 Watts FM
★ 10 Memories
★ Battery Save
★ 140-160mHz

£229!

ALM203E



The ALM 203E handheld transceiver is a conventional keypad entry transceiver that has a remarkable frequency coverage. Tx/rx extends from 140-150mHz and rx only extends from 140-160mHz, thus covering the marine band. Power output is 3 watts from the 450mAh nicad pack and the "battery save" circuit ensures long battery life. For full details send SAE.

ALINCO 2m LINEARS

The new ALINCO amplifiers are great value. Compact, reliable and low priced. Now you can boost the power of your hand-held without boosting your overdraft!

ELH 230D

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ELH260D

1-3w i/p 50w out
Switch pre amp
Vox or PTT
Output meter
£119.00 inc vat

NEW REVEX METER

W570

★ 1.6-1300MHz
★ RMS/PEP
★ 0-200 Watts

Here's a VSWR meter that covers every band from 160m-23cms! It also has remote sensor and "N" sockets. Highly accurate and automatic power readings.
PRICE £119.00 p&p £2.00

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Everything you have ever wanted to know about stations between 1.6 & 30MHz. Includes aviation, marine, military, press, broadcast and more. Not an import, but a proper UK written book of 130 pages.

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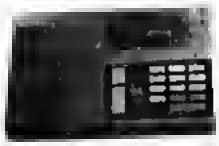

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ICF 2001D

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PRO80	HF/VHF AM/SSB handheld plus b'cast	£329.00
AN-1	Active antenna for 7600/2001	£49.00
AN-3	VHF antenna with 50ft coax	£45.00
ACD-4	Mains AC adaptor Air7/PRO 80	£16.95
BP23	Ni-cad battery pack as above	£16.95
DCC-12A	DC car adaptor all models	£19.95

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ICOM RECEIVERS

IC-R7000, 25-2000MHz. Commercial quality scanning receiver

The ICOM IC-R7000 hos estoblished itself os on odvonced technology, continous coveroge communicotions receiver. With 99 progrommoble memories the IC-R7000 covers oircroft, Marine, FM Broodcost, Amateur Rodio, television ond weother sotellite bonds. For simplified operotion ond quick tuning the IC-R7000 feotures direct keyboord entry. Precise frequencies con be selected by pushing the digit keys in sequence of the frequency or by turning the moin tuning knob. FM wide/FM norrow/AM upper ond lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25KHz. The IC-R7000 hos 99 memories ovoiloble to store your fovourite frequencies including the operoting mode. Memory chonnels con be colled up by pressing the memory switch then rototing the memory chonnel knob, or by direct keyboord entry. A sophisticoted sconning system provides in-stont occess to the most used frequencies. By depressing the Auto-M switch, the IC-R7000 outomoticolly memorises frequencies thot ore in use whilst it is in scon mode, this ollows you to recoll frequencies thot were in use. The sconning speed is odjustoble ond the sconning system includes the memory selected frequency ronges or priority chonnels. All functions including the memory chonnel reodout ore clearly shown on o dual-colour fluorescent display. Other feotures include diol-lock, noise-blonker, ottentuotor, disploy dimmer ond S-meter ond optionol RC-12 infro-red remote controller, voice synthesizer ond HP2 heodphones.

IC-R71E, General coverage receiver.

The ICOM IC-R71E 100KHz to 30MHz generol coveroge receiver feotures keyboord frequency entry ond infra-red remote controller (optionol) with 32 prog-rammoble memory chonnels, SSB, AM, RTTY, CW ond optionol FM. Twin VFO's scanning, selectable AGC, noise blonker, pass bond tuning ond o deep notch filter. With o direct entry keyboord frequencies con be selected by pushing the digit keys in sequence of frequency. The frequency is oltered without chonging the moin tuning control. Options include FM, voice synthesizer, RC-11 infra-red controller, CK70 DC odoptor for 12 volt operotion, mobile mounting brocket. CW filters ond o high stobility crystal filter.

Icom (UK) Ltd.
Dept RC, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

Count on us!

MOBILE

IC-900 Super multiband FM system

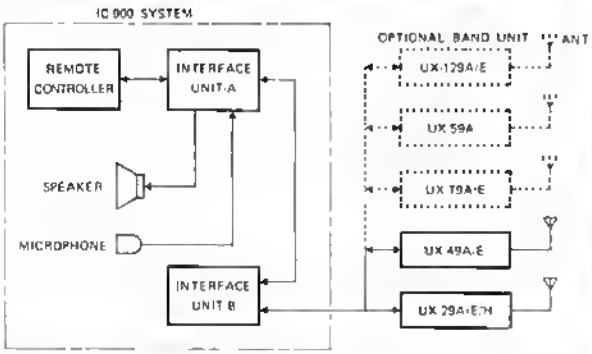
This new addition to ICOM's Ham radio equipment is a multiband FM transceiver system that allows the mobile operator to customize a communications system for his favourite bands. Up to 5 optional band-units can be installed with the IC-900 for instant access to a wide range of frequencies from the 28MHz HF band to the 1240MHz UHF band. Only a small remote controller is necessary for control of all these bands. A flexible optical fibre is used between the Remote Controller and the Interface Unit. The IC-900 has independent full duplex capability on all bands, praviding simultaneous receive and transmit operation. The function display on the Remote Controller shows two separate operating frequencies simultaneously. The IC-900 system transceiver is equipped with 10 fully programmable memory channels in each Band Unit. The system can therefore store up to 50 different memory channels. This revolutionary new concept is available from your ICOM dealer. Also feel free to contact ICOM(UK) LTD for assistance or information. The IC-900 Multi-band system consists of a Remote Controller, Interface unit B and a series of specially designed Band Units.

UX19	28–30MHz	10 watts
*UX59	50–54MHz	10 watts

*(No mobile operation allowed in UK)

UX29	144–146MHz	25 watts
UX29H	144–146MHz	45 watts
UX49	430–440MHz	25 watts
UX129	1240–1300MHz	10 watts

Multibander system block diagram



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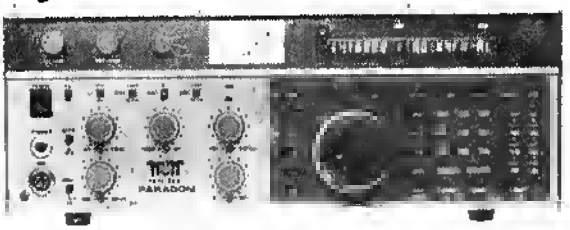

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FROM THE SECRETARY'S OFFICE

IN THE BEGINNING

Every radio amateur and swl in the world owes something to the four founder members of the London Wireless Club pictured on this month's front cover.

Cast your mind back to 1913, the age of the experimenter. An age where there was no television, no telephones as we know them today, no computers, no motorways, supermarkets or transatlantic jets.

Rene Klein (RKX) had a letter published in the *English Mechanic* on 6 June 1913. Part of his letter read: *When erecting my small wireless station some months ago and seeking for guidance in making of instruments etc, I was rather surprised to find that no amateur Wireless Club existed in London. It seems to me that the creation of such a club would prove a great boon to the many amateurs of London ... The advantages to be gained are somewhat obvious, both to the beginners and the more advanced ...*

Some of those who responded to Klein's letter met at his home in West Hampstead on Saturday 5 July 1913, and thus the London Wireless Club was founded. Two months later it became the Wireless Society of London, and then the Radio Society of Great Britain in 1922.

Rene Klein (RKX) was an egg merchant, Leslie McMichael (MXA) managed a laundry in South London, Fogarty later founded the Zenith Electrical Co, while Hope-Jones was a prominent member of the British Horological Institute and the managing director of the Synchronome Company.

Undoubtedly one of the main reasons why Rene Klein, the Society's first Secretary, wanted to form a club was to bring into being an organisation that would be able to negotiate with the Post Office, the then licensing authority, in order to safeguard the interests of *bona fide* experimenters. Five days after the London Wireless Club was formed, Klein wrote to the Post Office to seek a meeting. Earlier in 1913 the Post-Master General had told Parliament that he had decided to introduce new licence conditions – he had not told Parliament that he had also decided to impose a charge for the licence. Klein wrote: *One of the chief objectives of the London Wireless Club is the regulation, among amateurs, of experiments in transmissions, the checking of abuses by the use of untuned aerials, excess of power, and generally the elimination of causes which render serious work very often impossible.*

Klein wrote again seven days later as he had not received a reply from the Post Office, but on 22 July 1913 Sir Alexander King responded. He invited Klein and his colleagues to meet him; the very first time ever that a group of British amateurs had met the Government. The main bone of contention at the meeting, which took place on 26 July 1913, was the decision of the PMG to charge for an experimenters licence because of the clerical and station inspection work necessary before a licence could be issued. Though the licence fee was not reduced, the newly-formed radio association did offer to certify the qualifications of applicants for licences – an offer which was accepted by the PMG.

Within a few short months the London Wireless Club had over 150 members, each paying an annual fee of 10s 6d. It had its first President – Alan Campbell Swinton – and had begun its long association with the IEE.

In this very short slice of history we have many of the basic elements of today's RSGB. Mainly, though, to negotiate with the Government and represent the many with a single voice.

The rest is history – the RSGB went on to become involved with the foundation of the International Amateur Radio Union which today links all the many national radio societies throughout the world and which defends the status of radio amateurs at ITU conferences held in Geneva.

Today – as you will read in the 1987 President's AGM speech (see the *News Bulletin*) – amateur radio is again at a critical period. This year, 1988, will be an important one. Once again, as in 1913, every *bona fide* radio amateur must support the RSGB in its plans for the future, if amateur radio is to continue to flourish. It will only be the unity of radio amateurs which enables today's problems to be solved – but more of that later.

David Evans, G3OUF

Members' Mailbag

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The views expressed in published correspondence are not necessarily those of the RSGB, and readers are urged to verify independently any factual statements on which they may wish to rely as it cannot be guaranteed that such statements are correct.

WAB – For or against

Sir – First may I say that the team at the RSGB which writes the "News Bulletin" is doing fine. For me it's the best part of the magazine!

My reason for writing is to comment on the letter from G2VO. Mr Platt, I agree with you, entirely; and I am a keen WABer. I operate cw only, so cannot really comment on the ssb side of things, but I do the opposite to the folks Mr Platt has met. If I am ragchewing with a G and ask his WAB info and I find it's a new square, I express my happiness at working a new square and then continue the chat – maybe discussing that part of the country. It is not only bad operating to just swap numbers/letters with a *non*-WABer who has no interest in exchanging this type of information, but it is not what a majority of hams enjoy, and their is to **communicate.** (There are set WAB frequencies where the WABers do communicate, not just swap numbers etc, but they do chat!)

Surely Mr Platt cannot object to someone asking his WAB info as *part* of the conversation. I find his last comment quite alarming – calling CQ – NWAB, not all WABers are like those he has encountered. For the WABers who hunt rare ones – please think about the amateur you're talking to, he may not have your enthusiasm for WAB.

WAB is surely not just swapping numbers/letters, (why does not Mr Platt care to listen on the WAB frequency on 3.760kHz? – It's not that bad), it can form *part* of a QSO - unless of course you've got WAB mania.

Steve Mustor, G4VOI.

Sir – I feel I've had to reply to the letter from G2VO, in your October issue. I am pleased to see that Mr Platt used the expression "seems to be only interested in. . . .", that at least is a concession that he is not aware of the whole scope of WAB. I'm sure that members of RAIBC and QTI are far more appreciative of the wider aspects of WAB than he.

It is obvious that this has sprung from one or two chance contacts on the air and not from being a regular listener to the WAB nets, whatever band Mr Platt may care to listen on. On the regular nets one is assured of a warm welcome and will in fact find that once "business" has been conducted, Mr Platts longed-for rag chews are quite the norm on the nets. While I can understand Mr Platt being slightly annoyed at only having a short contact, I hope the other point of view can be understood, where the station collecting WAB areas does not wish to hold up Mr Platt, and thus terminates the QSO as quickly as possible. Has Mr Platt asked the stations in question to "tarry a while" and pass the time with him – additional WAB welcome? Maybe not, and maybe they would not wish to if they get a reception similar to the tone of Mr Platt's letter. It takes all sorts Mr Platt, and surely in our hobby we should be especially tolerant.

I will not comment on the use of "NWAB" being used in a QSO, apart from saying that this sort of thing has been suggested many times in the past in many different contexts and would equally apply for "NRC".

What quite amazes me about Mr Platt's letter are his references to this 'intrusion' appearing on 1·8MHz in the last few years. WAB on 1·8MHz has dramatically declined in these years in preference to other bands. From the records that are kept I can say that most of the WAB awards were issued in 1984/5, since then only one has been issued! I ask readers to drew their own conclusions as to the correlation between Mr Platt's claims and hard facts.

While I am the awards manager for the group, I would like it made known that the views expressed in this letter are totally my personal ones and I am not writing on behalf of the group as a whole. I'm sure that individual members will reply expressing their own views.

My final comments are, however, directed to you, Mr Editor. Mr Platt has every right to express his own views, a right that I respect. I would also expect a right to reply. It seems that you do not wish to give us the right in your totally biased question, "Is Mr. Platt alone in his WAB phobia?", at the end of the letter in question. This only invites replies from those in agreement with Mr Platt, anyone supporting WAB cannot answer this question. Why in this case did you not use the standard "any comments please"? The only answer to your question is "Yes" although there may be one agreement with Mr Platt and 100 against, bearing in mind you have not asked for replies from the 100!

D R Brooks, G4IAR

Ouch – yes, we could have worded our invitation to comment further a little more judiciously, and we apologise to the WAB fraternity for implying that pro-WAB replies were not required! Any other comments?

SPREADING THE WORD

Sir—Frequently one reads in amateur radio journals, or hears from fellow enthusiasts: "How can we interest young people in our hobby?" I also feel that many of us (probably RSGB included!) don't realise what a tremendous educational resource we are sitting on.

The Yeovil ARC has been active in spreading the word as follows:

1. As assistant tutors in a project week at a local comprehensive school. G3MYM, G1PZK, G4WMV and G0HDJ thoroughly enjoyed constructing simple receivers with a very mixed group of pupils—both in terms of sex and ability. Also involved was a demonstration station, all generating interest.

2. G4WMV, G3MYM, G4TIA and G4JBH provided a very popular section of a residential course on space science for able pupils from all over Somerset. Third-year pupils gained a thorough grounding in propagation modes, satellites and their applications, tried to measure galactic noise, and had a chance to take part in operating GB2KSS.

For most of the above it is the third or fourth time of helping on this course. We could provide the wherewithall and the knowledge in a unique way—filling in with the amateur astronomers involved in the more traditional areas of study. Is it fun? Probably the best week in the radio year for us! After all, it's worth giving up some holiday for it must be good!

As a result of a previous project week (1985) two youngsters are taking the RAE in December. From the previous GB2KSS operations we have gained several listeners—expressing a desire to go further. This year we actually encountered two 13 to 14-year olds already well prepared to take the RAE in May, one on the course and one visiting from Cheshire on holiday.

In short: the enthusiasts of tomorrow are there—but we must provide opportunities to sample and then enter the hobby.

Tim Heeley, G4WMV

USING GB CALLS TO ADVANTAGE

I recently visited an exhibition station put on in a local "Science Exploratory" designed, in part, to give young people a practical introduction to the world of technology. Listening to the remarks of some of the visitors, and looking around at the exhibits, it became clear that the station did not fulfil the requirement to inform visitors about amateur radio. Some of the problems were due to the situation: the room was far from ideal, but despite what I am sure the best intentions of the organisers, there were several things which did not put us in the best light. The problems I am sure were not unique and can be seen at any exhibition station, particularly the lack of RSGB-generated material. I offer a few observations with suggestions on what could be done better to enhance the image of radio.

First there was a lack of information about what "radio" is: to many it is taken for granted with so many high-quality push-button broadcast receivers around. We need to get across the concepts of frequency, wavelength and modulation, but in the manner of the IEE Faraday lectures. We need to explain ourselves more clearly by, for example, not using sets of initials—which are meaningless to many people—such as vhf, uhf, rtty and, dare I say it, RSGB. A long chat of the spectrum starting at audio frequencies — most people can relate to that—stretching up through ff (Radio 4), mf (Radio 1,2,3), hf (explain used for long distance) and so on up through to light (maybe) with key milestones put in.

Although morse code is an unknown to many, it is a good opportunity for us to allow some "hands on" experience with a receiver tuned to a good station or a computer running slow morse, even better if the visitor hears his/her name in morse. Add to this a key and oscillator (with headphones!) to enable visitors to "send", and we may enthuse more to continue the work of Samuel Morse.

The stations unfortunately gave the impression of a few enthusiasts huddled around a rig, and it was not clear what was happening. We need to explain what each station is (by poster or a "guide"), the audio should also be directed to the audience, there needs to be explanation of the jargon used, we may understand it but ask the "man in the street" what his QTH is. . ? A board indicating the station being worked and country would also be useful.

In conclusion, exhibition stations are a great idea but we must remember who we are trying to impress. So please, can some of the publicity ideas be taken up by the RSGB and material issued to special event stations.

Let us try to put amateur radio on the map.

Henry Higgins, G4ZVL

We weren't too impressed by some special event stations we visited this year—see the "Media" bit of the Annual Review in the November issue. There's some good advice for intending ses operators in the Operating Manual, and we're thinking about producing a Rad Com article about how to make the best use of that valuable GB callsign.

SPECTRUM DEREGULATION

Sir—I was perturbed to read, in *Rad Com* June 1987, the comment about the CSP International report on spectrum deregulation. Any threat to the continued use of our frequency allocations must be taken seriously, and preparations made to resist the potential loss or encroachment of our amateur bands. Since then I have waited patiently for news of the Society's response to the report and was therefore dismayed by the leader which appeared in October's *Rad Com*. In it, David Evans correctly points to the absurdity of CSP International's attempt to evaluate amateur band usage in purely economic terms. Clearly, the contribution made by the amateur fraternity to the continuous development of radio communication is substantial, yet could never be measured in quantative financial terms. For this reason, David's scorn at the superficiality and lack of insight of the report is justified.

However, derision in *Rad Com* will not prevent the proposed changes from being implemented if the DTI should decide to take CSP International seriously, particularly because the commissioning of the report will no doubt have cost a lot of public money. I would therefore have been far happier to have seen a copy of the Society's officially registered criticisms of the report, and its justification of those criticisms, addressed to the DTI. Of course, this response may already have been initiated. If so, it would have been reassuring to the membership to have been kept fully informed, rather than to have been treated to a flippant dismissal of the threat.

In these times, complacency is a luxury which the Society can ill afford. Please may we therefore have a serious assesment of the risk that the DTI may act upon some or all of CSP International's recomendations, accompanied by a clear statement of the appropriate defensive action which the Society would take?

Dave Lunn, G3LSL

The Society is currently drafting a long and detailed rebuttal of many of the fundamental tenets of the CSP report for submission to the DTI. Other organisations in the radio and communications industry are in the throes of doing the same. It inevitably takes time to prepare a detailed and complex response to a detailed and complex document, but members may rest assured that more information on this topic will be published as soon as it is available.

A power supply and control system for tetrode amplifiers

JOHN H NELSON, GW4FRX*, AND MELVYN NOAKES, G4JZQ†

(PART 2)

Screen grid supply

Refer now to Fig 2, which is a dual-channel screen supply capable of producing a regulated 350 or 250V for Class AB1 and Class C use respectively and which will source and sink some 30mA; it is a development of the design published in [1]. The description refers to one channel, which is Channel B (the right-hand channel looking at the circuit diagram). The raw input – which should be 420V or above – is fed via the optoisolator IC4b, whose function was discussed earlier, to the collector of TR8. With associated components this forms a constant-current source. The 748 op-amp IC10 has its inverting input voltage derived from the 82V reference from D39, which is compared with a sample voltage derived from the output rail in the resistor network R63, R64 and R65. This sample of the output voltage is compared with the reference voltage from D39 in IC10, which drives the shunt stabiliser element TR9. The output voltage is thus kept constant. Those familiar with the 748 will note that in this circuit the compensation capacitor has a considerably greater value than is usual. This "overcompensation" technique can be useful for ensuring stability in regulator circuits where the total open-loop gain is extremely high, as it is in this design. Note that an internally-compensated op-amp such as the 741 cannot be used in this circuit. The supply voltage for the op-amps is produced in a slightly unorthodox manner by D45 and D46 and the associated capacitors; these form a voltage doubler for which the zener diodes provide protection against stray transient voltages across the rails and enable the screen supply op-amps to be powered from a spare 6.3V heater winding. TR11, RV17 and R67 are for protection against excessive sink current, which could conceivably damage TR9. The output voltage of the supply is set to either 350V for Class AB1 working or 250V for Class C by means of RLA2. The output voltage of the B channel is fixed; however, the output voltage of the A channel can be varied by RV14 and RV15. The intention here is to enable the standing currents in a two-valve amplifier to be equalised, which is better done by variation of screen voltage than of control grid bias to individual valves. R69, R70 and R71 are GE MOV-11 varistors, whose function is to protect the screen supply circuitry in the event of flashover. In fact they are something of a backstop since GW4FRX's amplifers have for some years had a similar component directly between pin 1 of the valveholder and chassis and this seems to have worked well in protecting the valve and its base against flashover damage.

The performance of this design is very good. If 30mA or less is being sourced or sunk, the consequent variation in output voltage is not measurable on a 4·5-digit dvm. However, if more than some 40mA is drawn from the supply the output voltage quickly falls to a safe value so that the screen dissipation of the valve cannot be exceeded even under fault conditions. As would be expected of a shunt stabiliser, it has no objection to being short-circuited.

The output of the supply is fed to a changeover relay via metering and run/set switches, which enable each valve to be turned off individually by −150V applied to the screen grid so that the correct standing current can be set. For the 4CX250 and 350 family in linear service with about 2kV on the anodes and 350V on the screens, the optimum standing current for best third- and fifth-order intermodulation performance seems to be about 100mA per valve, as the data sheet suggests. Fig 5 shows a suggested scheme. This diagram also shows how the screen feed arrangements of many amplifier designs might profitably be modified to minimise both the risk of flashover and the consequent damage. The two 68kΩ 2W resistors and the vdr should be connected directly to pin 1 of the valveholder. Allowance will obviously have to be made in the screen metering for the 10mA drawn by the resistors, but this can be turned to advantage: if the meter intended for reading screen current is shunted so as to read 20mA full-scale, the 10mA drawn by the resistors when the supply is switched to Class AB1 turns the meter into a centre-zero type which can be suitably rescaled. Positive or negative screen current can then be read without the necessity for switching. The inductor is formed by winding about 10 turns of 22swg enamelled wire around the body of a low-value 2W resistor. In conjunction with the built-in capacitor in the valve base and the 680pF capacitor shown on the diagram, this forms an rf lowpass filter. Most 4CX250 amplifer designs include a low-value resistor in series with the screen feed to each valve, but it is difficult to see what this is intended to achieve. It can have little or no anti-parasitic effect, and in the event of a flashover the resistor will certainly force the voltage on the screen of the valve to rise to a very high value, which will almost invariably destroy the capacitor in the valve base. In general terms, the best thing to do with this resistor is to wind an inductor round it.

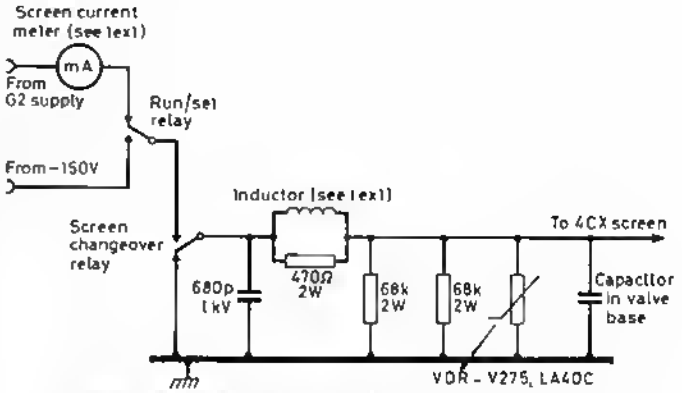

Fig 5. Suggested screen grid circuitry. Note that the VDR type number should read V275LA40B

In a series of some 20 test flashovers, which were induced by tuning and loading a W1SL-type 144MHz amplifier with these modifications incorporated for full output power into a dummy load, removing the load and applying full drive, there was no damage to any part of the amplifier or its power supply apart from blown fuses in the ehv supply and normal operation could be resumed as soon as the fuses had been replaced and the load had been reconnected. Incidentally, and contrary to the recommendations of some writers on the subject, fuses should not be inserted in series with the screen feed lines. The screen dissipation of the 4CX250B is 12W, and at 350V this implies a maximum current of some 34mA. The authors know of no fuse which will fail at a guaranteed 30mA or so with any consistency, and very-low-current fuses are prone to early fatigue failures with varying current. With a correctly-designed screen supply there is no need for fuses, and they can be positively dangerous if fuse failure leaves the screen grid floating; flashover and destruction of the valve base is likely to result. *Neither the control grid nor the screen grid of valves in the 4CX family should ever be allowed to float with no reference to cathode if damage is to be avoided.*

The changeover relay earths the screen on receive and connects it to the output of the screen supply on transmit. The bleeder resistors and vdr are connected directly to the appropriate pin on the valveholder as discussed above, so that the screen grid cannot momentarily float virtually to the anode voltage during changeover from transmit to receive and vice-versa. Earthing the screen grid during receive periods avoids shot noise in the receiver, and also any chance of the capacitor in the valve base charging as a result of secondary emission effects and taking the screen voltage to a high value. Together with the bleeder resistor/vdr combination, this also considerably reduces the chance of flashover. A further advantage of the changeover system is that any alarm in the

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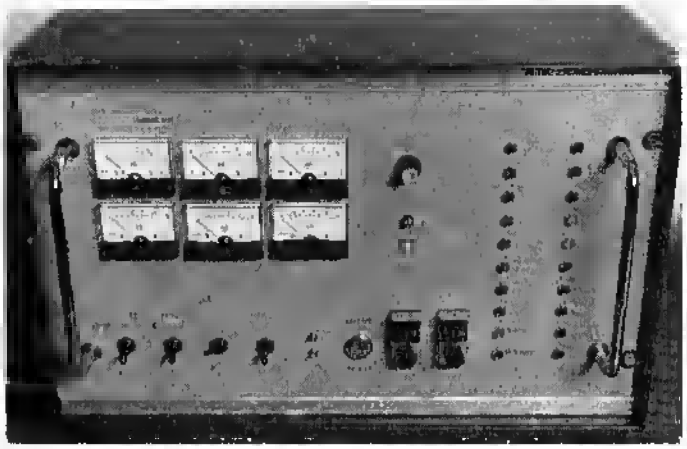


Front view of the complete equipment

control unit or failure of the ehv can be made to earth the screen grids, using the "ready" relay RLD as discussed above.

There are various devices which can be used in this design. The cheapest option is to use BU208 television line output transistors for TR6–9 and these will work well even though the h_{fe} of some BU208s has been found to be very low. It should be added, however, that under short-circuit conditions a BU208 used in the constant-current source (ie TR6 and TR8) is taken some way outside its published safe operating area (S.O.A.R) and should therefore be theoretically destroyed when the supply is short-circuited because of the tiresome bipolar transistor affliction known as "second breakdown". The authors would merely say that in some five years of using both this design and its predecessor, which has been built by many constructors, no cases of device failure under short-circuit conditions have been experienced or reported to them. However, purists may wish instead to use one of the family of transistors developed in recent years for high-voltage switched-mode power supply use, whose S.O.A.R parameters are rather better than those of the BU208; the BUS13A and BUS14A have been tried in this design and work well. Transistors which are, on paper at least, even less rugged than the BU208 in this respect have also been tested in this circuit and have not been persuaded to fail; these include the BU108, BU226, BU326, BU500 and BUW46. If particularly esoteric devices with very high h_{fe} are used it may be necessary to increase the values of R50 and R52, which set the short-circuit current. The quoted value gives about 60mA with most of the above transistors and input voltages between 420 and 450V.

As far as the shunt stabiliser elements (TR7 and 9) are concerned, all the above devices have been tried and work well. The version currently in use at GW4FRX uses Motorola high-voltage Darlingtons which were removed from a scrap smps and which also work well; these are BUT16s. The BUT16 is a 1·4 kV 30A device; its even bigger brother, the 60A BUT36, has been seen at recent rallies for 50p, and in this relatively QRP application it operates very well. The authors suspect that several other tv line output or smps transistors could be used in this part of the circuit, although they have not been tried. However, high-voltage Darlingtons will not work efficiently in the constant-current source position. Another possibility for the shunt stabiliser (and indeed for the constant-current source) is a power mosfet. Any device with a Vdss rating in excess of about 6–700V and a current rating of an amp or so should work well, although minor component changes need to be made. If a mosfet is to be used in the constant-current source, D32 and D33 should be changed from 6V8 to 8V2 devices and the value of R50 and R52 should be increased to 68k 2W. For use in the shunt stabiliser element, C32 and C37 should become 1nF and a 2·2kΩ resistor should be added in series with each capacitor. The diodes on the output of each op-amp, D34 and D44, should be removed and links fitted on the pcb in their place. Low-value (around 100Ω) "stopper" resistors may be required on the gate pins of each fet. Tests on one of the prototypes were carried out using IRF430 devices and very good results were obtained; second breakdown and S.O.A.R. considerations cease to be relevant and the extremely high effective gain when mosfets are used gives in excess of 80dB hum rejection. The authors have not tried a mosfet-fitted version "on-air", as it were, but there is no reason why it should not work perfectly well. Finally, TR10 and TR11 can be almost any small-signal npn device; since the BC107 seems to be in many people's junk boxes, that is the one shown on the circuit diagram.

The zener diode D35 is a 10W stud-mounting component. It is worth noting that devices in the BZY93 series are available with either the cathode or the anode as stud, and in the present design the stud anode variant (denoted by the "R" suffix following the voltage in the type number) is obviously more convenient.

Control grid supply

Fig 3 is the circuit of the bias supply. The heart of it is an over-compensated 748 driving a shunt stabiliser transistor, TR5. RLB1 selects the appropriate voltages for Class AB1 or Class C use. Operating voltage is derived from a three-terminal regulator IC7, which can also be used to produce a variable negative-going ale voltage for power control of many commercial transceivers.

A timing element is included in the transmit/receive switching of this supply, which causes it to take some 100ms to switch to transmit from receive but only a few milliseconds to return to receive from transmit. Two methods of transmit/receive switching are possible, both of which are initiated via pin 72. The first is to fit D48 and R68 and to omit link 1; this option is used with the circuit shown in Fig 6. The value of R68 should be chosen to pass about 5mA when the ptt switch in Fig 6 is open-circuit; the formula is;

$$R = \frac{\text{antenna c/o supply voltage} - 9}{5} \quad \text{k}\Omega$$

On transmit, C26 in the bias supply delays turn-on of the valve(s) until both antenna and screen changeover relays have operated. When switching to receive, the back emf from the relays causes the voltage at R68 to rise very quickly; the output from the bias supply therefore goes negative and takes the valve(s) out of conduction before the relays actually open. The result is that the antenna changeover relays never switch if and there are no heavy pulses of anode current at the changeover. If D48 and R68 are omitted and link 1 fitted, leaving pin 72 open-circuit corresponds to the transmit condition. Extending an earth to pin 72 switches the supply to the receive mode. This option may be more suitable for some users.

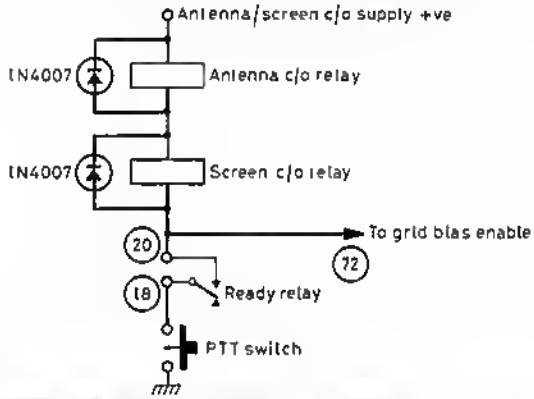


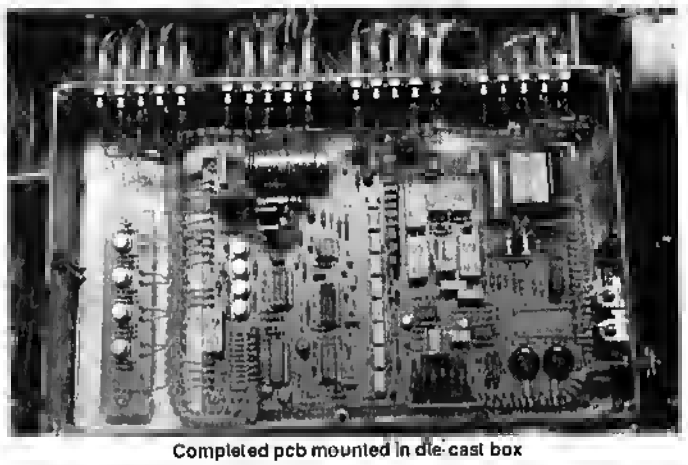
Fig 6. Suggested transmit/receive changeover arrangements

The performance of this supply is also good. Because its reference is a 5V1 zener diode—a value which has a temperature coefficient of virtually zero—the long-term stability of the output voltage is excellent. Since the supply will sink up to 60mA without difficulty, there are no problems of fluctuation of the working point of the valve as a function of grid current. More importantly, since there is no changeover relay in the transmit/receive circuit the control grid of the valve is never in danger of "floating" at an indeterminate voltage with respect to the cathode when changeover takes place, which removes another common cause of flashover. The output ripple of the bias supply is less than 2mV pk-pk.

The range of transistors which can be used for TR5 is a little limited, at least if the choice is restricted to commonly available devices, because of the combination of the moderately high collector-emitter voltage rating which is required and the need for a pnp device. However, the specified Motorola MJE350 is quite easy to obtain. The BFT44 and 2N5415 also work well if available, although both use the TO39 encapsulation as opposed to the TO126 of the MJE350.

Construction

The printed circuit board carries the control logic, screen supply, bias supply and regulators for auxiliary supplies, together with the three relays switching the supply voltages for Class AB1 Class C operation and changing alarm threshold voltages as appropriate, and the "ready" relay which enables or disables the ptt and switching system as discussed. The board is quite densely laid out and is not recommended as a first exercise in pcb construction; the authors have assumed that anyone considering building a high-power amplifier will not be a complete novice in the art of home-brewing. It is suggested that when the board is complete it is fitted



Completed pcb mounted in die-cast box

into a standard-sized die-cast box and the connections to it taken out either via feedthrough capacitors or multiway connectors such as D-types. The box can then be fitted into a suitable chassis which contains relays, metering, transformers and other ancilliary components. The version built at GW4FRX is shown in the photographs. A diagram of the pcb layout is given as Fig 4.

Beginning with the screen supply, it will be noted that there are two removable links between the constant-current sources and the shunt stabilisers. These are for initial setting-up of the standing currents, as discussed later. The links can either be made from Veropins joined with wire or the small "U-links" plugging into miniature pcb sockets which are available from Maplin or Electromail. RV12 and RV13 are ordinary pcb-mounting cermet potentiometers; all other variable resistors on the pcb were of the small multiturn wirewound variety in the prototypes, although provision has been made on the board for other styles of component and some economies can be made here if required. R52 and R50 need to have a rating of at least 2W and can either be metal-oxide resistors or chassis-mounting wirewound components bolted to the side of the die-cast box as shown in the photograph. The constant-current source and shunt stabiliser transistors require to be mounted on a heatsink, although they are dissipating relatively little power and the chassis could serve the purpose. The wiring between the transistors and the pcb should be kept reasonably short and direct, and screened multiway cable should be used. Although the D-type connector is usually associated with the strange world of RS232 and low digital voltages, the voltage rating of most D-type connectors is 750V dc or peak ac, and there have been no difficulties in using them to connect the screen supply transistors to the parent circuitry.

It will be noted that in the photograph of the completed unit mounted in its die-cast box there is an additional small pcb to the left of the main board. In the unit built at GW4FRX it was decided to save front-panel space by combining the screen over- and under-voltage alarm l.e.ds associated with each channel in a single hi-colour l.e.d. Unfortunately it was discovered that all hi-colour l.e.ds feature the common cathode configuration: there appears to be no such thing as a common anode hi-colour device and hence the circuit as it stands cannot be used. The four extra transistors on the additional board are simple inverters to interface the cmos with common-cathode bi-colour l.e.ds.

Since the screen supply as a whole possesses excellent ripple rejection and line and load regulation characteristics, a large value of input reservoir capacitor is not required, and anything larger than about 16µF will suffice. Note that the main rectifiers for both the screen supply and bias supply are both mounted on the pcb and, in the case of the latter, so is its reservoir capacitor.

Coming now to the bias supply, R43 is also a 2W component and is subject to the same comments as R52 and R50 above. C20 is the main reservoir capacitor; since the ripple rejection of the bias supply is very good and also little load current is drawn, two 1µF polycarbonate capacitors were used in parallel in the prototypes in the interests of helping stamp out electrolytic components. TR5 is dissipating very little power and hardly requires a heatsink, but if an MJE350 is used with its TO126 encapsulation, it may be mounted on the die-cast box with the appropriate mounting/insulating kit. Other devices may require some minor rearrangement of their mounting to suit the pcb pinouts. RLA–D are small pcb-mounting two-pole changeover relays which are available from various sources: they are usually referred to as "BT Type 47".

As far as the control logic is concerned, R31–R38 are all 2·2kΩ resistors which may either be discrete components or an eight-way dual-in-line resistor array. The positive regulator, IC5, can be mounted on the die-cast box for heatsinking purposes, although the negative regulator IC7 does not require a heatsink. The main timing capacitor, C15, should be a tantalum component; C14 should ideally be tantalum also, although in practice a conventional electrolytic will work. It is worth mentioning that the charging currents of both capacitors are very low and, in the case of C14, the charging current from R14 is not likely to be much larger than its leakage current. The figure of 2.5min quoted for the timing period of the audible alarm is therefore likely to be variable for different realisations of the design, depending on the quality of timing capacitor used. This is acceptable as high accuracy is not required.

Note that a value is not quoted for R9 in the input to the ehv detector IC1e. This should be chosen with regard to the value of ehv at which the system is to accept anode voltage as being present, and to suit any sampling arrangements made elsewhere — for example in the ehv metering. It is emphatically not recommended that the ehv is applied directly to pin 36; a potential divider in the ehv power unit should be provided and a small sample of the ehv supplied to the control unit, with the value of R9 chosen on the assumption that the output of IC1e will switch from low to high when its input reaches about 6V. From the point of view of safety it is best to use a two-stage divider. The first stage should divide the ehv down to perhaps 100V, and should ideally have a zener diode of a suitable voltage rating in parallel with the lower resistor in the divider chain to limit the divider output voltage if the resistor fails open-circuit or loses its earth connection. The second stage should divide the output of the first down to the required voltage. Both stages should be in the ehv unit, and only good-quality wirewound resistors which are generously rated should be used. The final output of the divider should be higher than 7V at the running value of ehv to avoid high dissipation in the output stage of IC1e.

In view of both the high voltages present on the pcb and the high impedances involved in the cmos circuitry, it is strongly recommended that when the board has been completed and tested the track side is thoroughly defluxed with an appropriate solvent, such as the aerosol solvent cleaner available from Electromail under the stock number 556-648, and then given several coats of pcb lacquer; the "anti-corona" aerosol from the same source (stock number 555-617) is excellent for this purpose. When mounting the completed pcb in the die-cast box, make sure that there is at least a 10mm clearance between the track side of the board and the box to avoid short-circuits.

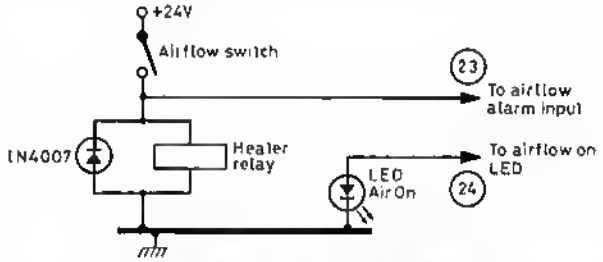


Fig 7. Suggested air-flow switch arrangement

Setting-up

Like most logic circuits of this type setting-up is tedious rather than difficult. It is probably easiest if the bias supply is tested first; check to see that the output voltages in Class AB1 and Class C are correct at around −55 and −90V respectively in the transmit condition and that they can be varied by means of RV10 and RV11. If an oscilloscope is available, the quality of the output voltage and the t/r timing can be inspected. Check that switching the supply to the receive position causes the supply output voltage to be the same as the input voltage.

The screen supply should then be tested, beginning in Class AB1 (ie without RLA being operated). First, removed the links between the constant-current source and the shunt stabiliser on both channels. Connect a milliammeter between the link pins on the channel carrying the output reference, which is channel B (the right-hand link of the pair on the pcb). Connect a voltmeter to the output of channel B (pin 40). Switch on and allow a few seconds for the supply to start up and settle down. When the readings on both meters have stabilised, adjust RV13 for a standing current of 30mA (40mA if the centre-zero metering scheme described on page 20 is not to be used). The output voltage should be around 345V at this stage. Switch off and replace and milliammeter with a link; reconnect the milliammeter across the link pins in channel A. Connect the voltmeter to the output of channel A (pin 41). Switch on and

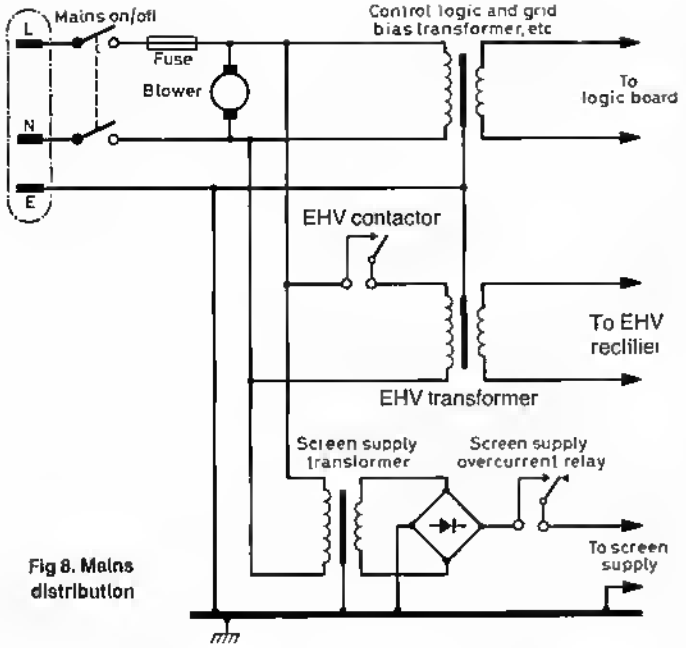


Fig 8. Mains distribution

allow the supply to settle down; adjust RV12 for the appropriate standing current. Check that the output voltage is about 345V. Switch off and remove the milliammeter; replace it with a link. Switch on again and observe the output voltage; it should initially stabilise at about 345V, and as the circuit warms up it should reach around 350V. Obviously the precise value of output voltage depnds on several factors, of which the most important is the actual zener point voltage of D39.

Next, check that the voltage of channel A is variable by means of RV15; some 30V variation should be available.

Switch off and select Class C. Switch on and check the output voltage of both channels; it should be somewhere around 245V. Check that the output of channel A is variable by means of RV14. When these adjustments have been completed, switch back to Class AB1 and measure the raw dc input voltage to the supply. Select a resistor whose value will cause about 30mA to flow when connected between the output of the reservoir capacitor and the output of one channel of the supply. The formula is:

$$R = \frac{\text{input voltage} - \text{output voltage}}{30}\ \text{k}\Omega$$

Connect the voltmeter to the output of the selected channel and connect the resistor. Adjust RV16 or RV17 as appropriate so that the output voltage just rises above the correct value. Switch off and repeat for the other channel. This procedure sets the maximum sink current for each channel of the supply at about 30mA and acts as protection for the shunt stabiliser transistors. If an oscilloscope is available the stability and ripple rejection can be checked. Unless the reservoir capacitor is of a low value, the output ripple should not be worse than a few millivolts and the output noise should be no higher than about 5mV. The screen supply is now ready for service.

As far as the control logic is concerned, setting-up is a matter of systematically checking that all alarms operate, that the main timer and audible alarm timer work, and that the "ready" relay operates when all supplies have been established. The screen supply overvoltage alarm thresholds should be set by means of RV4 and RV5 so that the alarms operate at about 355V; similarly, the screen undervoltage alarms should be set via RV1 and RV2 to operate at about 340V. It should then be found that the alarm thresholds are correct for the corresponding Class C output voltages. RV6 and RV7 can then be set to operate the grid bias alarms at about 5V less than the chosen bias voltage; fine setting of these will need to be made after the unit has been connected to an amplifier and the actual bias voltage required for the valves established. The screen overcurrent alarm can be tested by passing a current of about 80mA between pins 71 and 70 (pin 71 positive) and adjusting RV8 until it operates. After about 7s the screen overcurrent relay should operate and should continue to cycle until the operator intervenes or the fault clears. The cht failure detector can be checked by applying +12V to the cathode of D15, which should extinguish the associated l.e.d.

With all alarms cleared, the ehv contactor output pin, pin 16, should go low after about 1min. If a simulated ehv sample is then applied to pin 36, the "ready" relay should operate. If the ehv sample is not applied, the master alarm should sound after about 2·5min. Simulating any failure should result in the "ready" relay opening, pin 16 going high and the master alarm sounding.

The Class C overdrive level is best set up with the amplifier operating, to whatever grid drive level the operator wishes to use. The unit powering the current GW4FRX 144MHz amplifier is set to trip at about 2mA of grid current, since at that point the licensed limit of cw output power is reached.

Conclusion

With a power supply and control system of this type, and assuming that the amplifier is a sensible design and has been properly adjusted – particularly in respect of neutralisation and the output tuning and loading – the limiting factor on intermodulation performance should become the transfer characteristics of the valve(s) themselves. In the case of the 4CX family, and in particular those members of it designed for linear service, the potential performance at the maximum licensed power is excellent. It is worth adding that, despite repeated attempts, the authors have not yet found a way of destroying valves, bases or components as a result of simulated mistakes and failures, so it would appear that the protection circuits in the design are effective.

One final point – and even if the rest of the article bored you to tears you'd better read this particularly carefully. The voltages and currents in and around the anode supply in high-power amplifiers, whatever valves are used, are nothing less than ***deadly*** *if you come into contact with them. You* ***must*** *take very great care when working on or around QRO valve amplifiers, no matter what the circumstances. Almost nothing else in amateur radio is as important as this rule, and there are absolutely no exceptions to it. Even the voltages and currents around the screen supply in the present design will easily kill you if you don't give them some respect. Don't become a statistic – we would much rather publish articles than your obituary.*

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Component availability

A components list and a copy of Fig 1 in Part 1 which was badly printed can be obtained from the editor at RSGB HQ by sending an sae.

Three good sources of components, all of which produce comprehensive catalogues are: STC Electronic Services, Harlow, Tel: 0279 26777.
M S Components Ltd, London SE27. Tel: 01-670 4466.
Electromail (a division of RS Components), Corby. Tel: 0536 201201.

In cases of difficulty, John Nelson is prepared to assist individual constructors with component procurement. He can be contacted via Telecom Gold, mailbox number 72:MAG20426, which is also available via Telex on 265871 MONREF G quoting the above reference.

Melvyn Noakes is prepared to make available pcbs for this design; he will also undertake the construction of complete units. He can be contacted at 328 Watford Road, Chiswell Green, St Albans, Herts AL2 3DP. Tel St Albans 34969. □

An electrically-steerable vertical parasitic array for 10MHz

R C WHELAN, G3PJT*

WITH AN electrically-steerable antenna, the direction of radiation is controlled by changing the electrical relationships between the radiators in an array. No expensive rotators and special cables – just a relay box, some coaxial cable and two variable capacitors to make a four-direction, four-element hf beam with excellent directionality and performance. The design described is for 10MHz, but simple scaling will put the same design into 7 or 14MHz.

Background

The 10MHz band is heavily congested – not with amateur signals but with strong commercial stations – but the propagation characteristics are such that long-distance communication is often possible. However, in order to be able to use the band effectively for dx, a directional antenna with good low-angle characteristics is needed. I have used vertically-polarised loops and a two-element fixed reversable beam (east – west) with considerable success, but to operate the Pacific polar path, greater control over direction is necessary and I needed a steerable antenna. The dimensions of antennas at 10MHz are significantly larger than those at 14MHz and the construction of rotatable Yagis and quads seemed to need a standard of engineering beyond my resources and, I suspect, those of many others. Alternative approaches, using arrays of vertical elements were therefore researched.

Arrays of vertical elements when fed with currents of the correct phase and amplitude are capable of producing strongly directional radiation patterns [2]. If your interest is one particular direction, linear arrays give the best results. If, however, you require all-round coverage, arrays with circular symmetry are more appropriate, such as the four-element array with quarter-wave elements in a square formation, quarter-wavelength on a side [3, 4].

Such an arrangement has four principal beam directions, with a main lobe wide enough to cover the intermediate directions. Beam direction is changed by changing the phase of the current fed to the radiating elements. Direction change is very rapid and can even be different for transmission and reception. Normally all elements are driven, the necessary drive currents being derived from phase-shift networks, but there is no reason why some of the elements in the array should not be parasitic elements, provided that the correct phase and amplitude relationships apply. Parasitic operation is attractive since it removes the need for the phase-shift networks and power dividers. As it may not be possible to control the relative phases and amplitudes quite as well in a parasitic array as in a driven array, the parasitic array may not reach the same levels of performance in terms of either gain or directivity. However, in practice, a good performance is readily achievable.

Fig 1 shows an elegant arrangement of four vertical elements [6]. In contrast to arrays where the vertical elements are quarter-wave long [2, 3], dipoles are used in this design as the height of mast support available was adequate. The use of dipoles reduces the dependence of the array on an extensive groundplane which is always required with quarter-wave radiators.

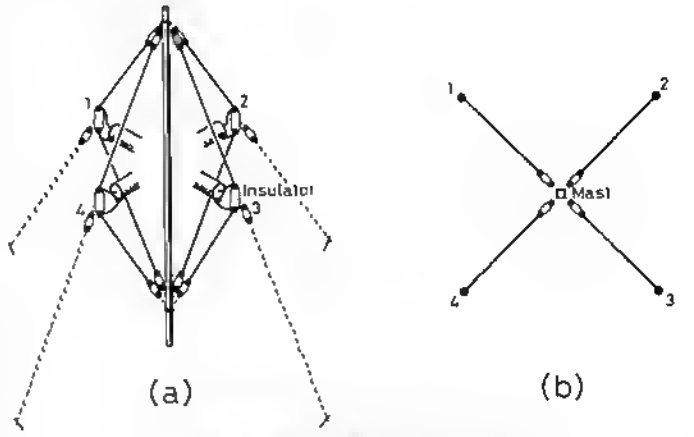


Fig 1. (a) Basic array (Ref [6] p190). (b) Plan view

The configuration shown in Fig 1 appears to operate best as a parasitic array if the elements are arranged so that elements 2 and 4 are driven in phase as a driven element, element 1 is tuned to operate as a director, and element 3 is tuned to operate as a reflector. The array can be viewed as a three-element Yagi on its side with a split driven element. In plan view (Fig 1 (b)) the array fires in the direction 3 to 1 diagonally across the square. To change the direction to fire from 1 to 3, the roles of elements 1 and 3 are reversed; to fire from 4 to 2, elements 1 and 3 are driven, 2 becomes the director and 4 the reflector; and then to fire from 2 to 4, the roles of 2 and 4 are reversed.

Feeding the driven elements in phase is achieved by feeding them in parallel. The method employed to tune the elements for director and reflector action requires some explanation. In [1] centre-fed dipoles used in a shaper array were tuned as reflectors, using the unconnected coaxial cable as an open-circuit loading stub. I used this technique to load the reflector of a delta loop beam but found that it relies on accurate trimming of cable to length [7]. The addition of a variable capacitor across the end of an open-circuit coaxial line is an easier way of varying the resonant frequency of the element, it being possible, with a judicious choice of coaxial length, to both lower the resonant frequency for reflector action and to raise the frequency for director action (A Smith chart is useful to determine the correct lengths [6 or 7]). As all the four elements and feedlines are the same, the line lengths and capacitor values required remain the same whichever direction the array is pointing, the radiation pattern remaining substantially the same for each of the four directions. The dipoles are fed with coaxial cable, thus giving rise to an unbalance to balance problem at the feedpoint. This does not seem to be severe, possibly because the vertical dipole close to ground is a highly asymmetric element.

*36 Green End, Comberton, Cambridge CB3 7DY.

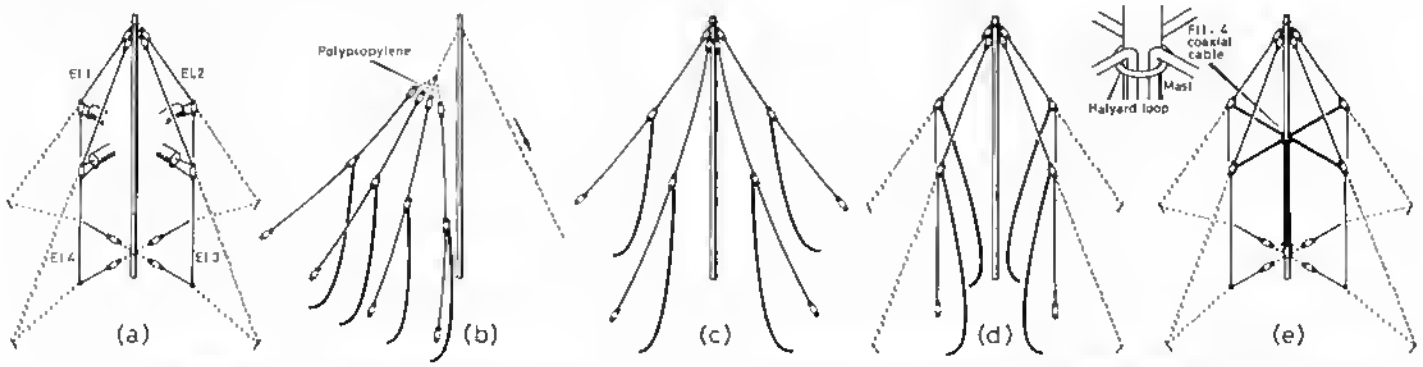


Fig 2. Practical assembly of the array, showing the shape and arrangement of the dipoles. Detail shows the halyard loop supporting the coaxial feeders

Practical design

Dimensions and shape. The array is tolerant to limited geometry and size changes. Element spacing, for example, can be between 0·17Gk to 0·33λ. Site considerations limited the element spacing in my case to 0·2λ. In order to minimise interaction between the mast and the elements, the elements should be kept as far away from the mast as possible and the coaxial feedlines should run directly away from the centres of the elements. To give sufficient ground clearance around the base of the mast, the arrangement shown in Fig 2 (a) was used.

Support. The central support should preferably be of wood (45ft high) but I used a metal mast insulated from ground. In order to prevent static build-up, a metal mast should be connected to ground via a high-value resistor or an rf choke. The mast should be guyed with non-conducting rope, and will require two halyards – one to support the top ends of the dipoles at the top of the mast, the other to support the four coaxial feedlines about halfway up the mast. It did not seem wise to integrate the radiators with the mast guys as proposed in [6, page 190].

Elements. Four identical dipoles for 108MHz are required (EL1-4). Each dipole is fed with 38ft of RG58 coaxial cable (FL1-4). The leg of the dipole connected to the outer of the coaxial cable should be clearly identified, as this leg has to be the lower leg, ie the leg nearest the ground. Each dipole should also be clearly numbered by tagging each end of the coaxial cable. It's difficult to tell which dipole is which when they are 20-30 ft up! In addition, a tag should be attached to each coaxial cable 13ft from the dipole centre connection.

Assembly

Fig 2 shows how the dipoles are assembled on to the mast. This task can be quite time consuming, so don't start in the evening! Attach the upper leg of each dipole to the halyard using 1ft of polypropylene rope (Fig 2 (b)). Separate the dipoles – a second person helps – and raise the dipoles up the mast until the centre of the dipoles is at the ground level (top of dipole at about 25ft) (Fig 2 (c)). Walk each dipole round to its position; this will involve threading dipoles and cables through guys etc (Fig 2 (d)). I have my array oriented north, south, east and west; an alternative might be northeast, northwest, southeast and southwest.

Attach a light polythene fishing line to each centre insulator. This line will be used to pull the dipole away from the mast into its correct position. Raise the dipoles to the top of the mast. Using the line attached to the centre insulator, pull each dipole from the mast by about 12-14ft (Fig 2 (e)). The lower ends of the dipoles will be close to the ground with the dimensions given. Attach a further line to the lower leg of each dipole 6ft from the end insulator, and attach this to a convenient tie point so that the lower leg hangs vertically from the centre insulator. Tie the last 6ft of each dipole back towards the mast and the centre of the array. All four dipoles should look the same relative to the mast (Fig 2 (f)).

Make a 6in-diameter loop around the mast with the second halyard, and thread the four coaxial cables through it. Raise the cables to the 25ft level, allowing the cables to run through the loop freely. At the 25ft level, secure the halyard and pull the cables equally until the cables run directly from the dipoles to the loop (Fig 2 (f)) and until the 13ft markers are close to the halyard loop and the mast.

This procedure has been described in some detail as it is important to position the four dipoles as symmetrically as possible so that the radiation pattern and impedances etc do not change as the array is switched. If the coaxial cables are allowed to hang adjacent to the lower leg of the dipole, a much inferior radiation pattern will result.

Electrical circuit

The dipoles have to be driven in the correct relationship: each dipole will either be a driven element, a reflector or a director. The circuit is shown in Fig 3. A three-core switch line (two core and earth return) gives the four combinations required. Six 12V relays connected in series/parallel arrangement perform the changeover; 24V is used to reduce control line IR losses. The action of the circuit is that relays 1 to 4 switch the pairs of driven elements and thus rotate the beam heading by 90°. Relays 5 and 6 reverse the director and reflector and thus reverse the beam heading. The connections shown give North as the OFF position but this could be changed simply to any other preferred direction by changing the connections. Note that dpdt relays are used, as both conductors of the coaxial feedlines need to be switched for correct director and reflector action.

The impedance of the paralleled driven dipoles is close to 50Ω but reactive, a parallel capacitor corrects this to 50Ω resistive. The parasitic dipoles are tuned using the combination of coaxial cable and variable capacitors. With the 38ft length of coaxial cable any dipole can be made to act as a reflector with about 100–200pF across the open end. For

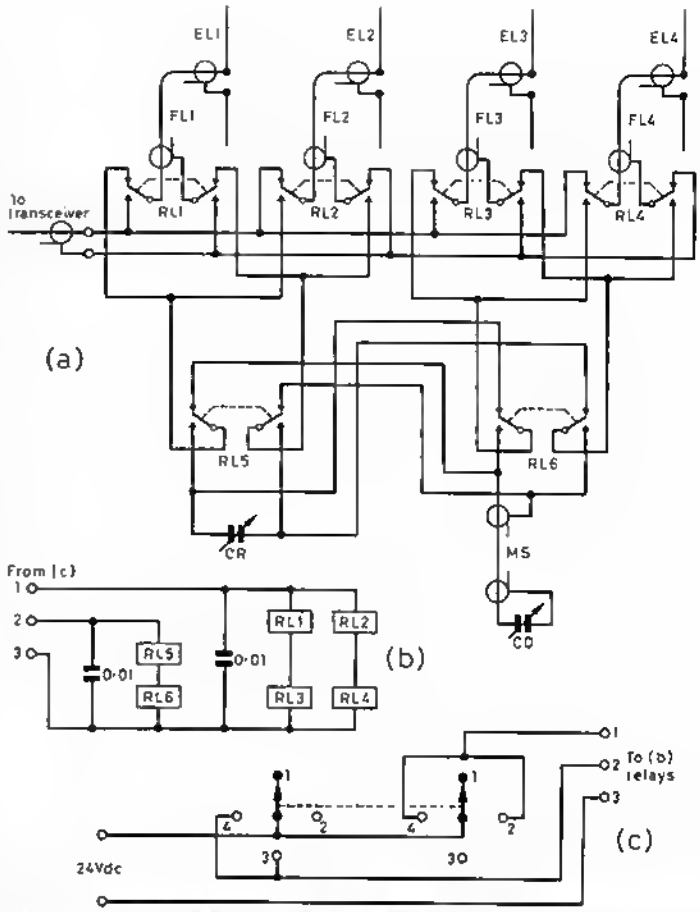


Fig 3. Electrical circuits. (a) Switch box positioned at base of mast, (b) Relay coil connections. (c) Control box for directional switching at operating position

director action, an inductance in parallel with the open circuit end would be required. This is much less convenient, so this is simulated by connecting an additional quarter-wavelength of coaxial cable between the end of the feedline and the variable capacitor. The quarter-wavelength changes a capacitive reactance into an inductive reactance and allows a variable capacitor to be used for director tuning. It is assumed that most readers will wish to switch the array remotely from their operating position. However, if the array is close it may be more convenient to extend the four feedlines to a switch and tuning system at the operating position. The extension of the feedlines should be in multiples of half electrical wavelengths in order to preserve the values required to tune the director or reflector. The switch box should be non-metallic and waterproof.

Testing

The tuning of the array can be confusing if there are any faults in the connections. A few common ones are:–

(a) Relays incorrectly wired. Set up a dc test to check sequence and continuity.

(b) Check that the dipoles are correctly connected, ie coaxial outer to lower leg. You can do this after they have been raised using an ohmmeter

Components list

RL1-6	DPDT 5A contacts 12V dc relays
Cr, Cd	Air-spaced variable capacitors 400pF swing receiver type
MS	Matching section 16ft RG58 50Ω coaxial cable
FL1-4	Feedlines 38ft RG58 50Ω coaxial cable
EL1-4	Dipoles 47ft 16swg hard-drawn or similar
Switch box	Wooden or plastic (non-metallic). Water proof and seal
Control line	Three-core 5A cable
S1	Four-way two-pole rotary switch

Note that most of these components will be subject to an arduous environment from the aspect of temperature and humidity. Although component types are not critical, select them with this fact in mind. A spray with "Dampstart" or similar water repellant should inhibit the ingress of water.

to check continuity between the end of the lower leg and the outer of the corresponding coaxial feed line.
(c) Check that the sequence of the dipoles is correct. If you tagged them at both ends you won't have this problem.
(d) Check that the ends of the feedlines are open circuit. This is best done before raising the antenna.
(e) Connect an swr meter in series with each dipole, and in turn apply low power at 10·1MHz and check that they all have similar swr.
(f) Identify which direction corresponds with which switch and relay sequence. It's very tricky tuning up and not being sure which way the array is radiating.
(g) Check that the array is symmetrical, ie all the dipoles and feeders around the mast.

Tuning

In order to tune the array, some basic equipment is needed – a sensitive rf detector with a remote meter indicator (portable receiver with remote S-meter, sensitive field strength meter or similar with a vertical antenna) – a low-power oscillator which emits a clean, stable but identifiable signal. Very low power sources make tuning difficult but high power is anti-social, especially if the signal is not identified.

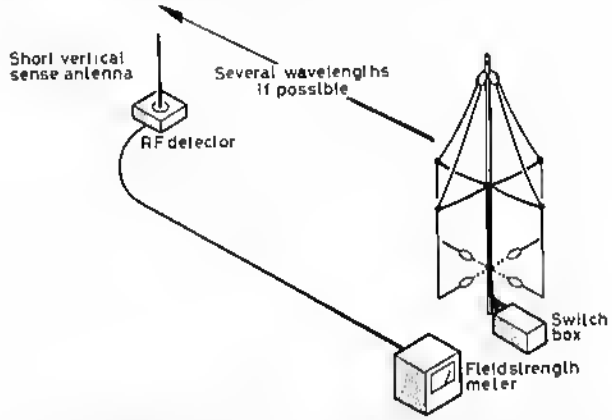


Fig 4. Arrangement for tuning showing position of array and test antenna

The set-up for tuning the array is shown in Fig 4. Position the detector as far from the antenna as possible (greater than one wavelength) but in line with one of the main beam directions. Place the meter at the switch box so that it is easily visible while adjusting the array. Switch the array to radiate in that direction and set both the capacitors to 100–200pF. Drive the array from the low-power oscillator; some reading should be seen on the detector – if not, increase power or sensitivity or both! Peak the director capacitor (Cd) and set the detector sensitivity to give fsd. Switch to the reverse beam heading (c/o relays 5 and 6) when the reading will drop somewhat. Adjust first the reflector capacitor (Cr) for a minimum. This may be close to minimum capacity, then tune the Cd for a minimum, increasing the sensivity if necessary. Reverse beam headings and check that the forward reading has not fallen very much. At this point the beam is useable but will not have an optimum radiation pattern. In order to help the tuning process Table 1 lists some of the readings obtained on the prototype array.

Table 1. Sample field strength readings during testing (detector west)

Condition	North	South	East	West
Minimum back	15	11·5	4·3	49
Minimum side	9·2	8·8	4	44

Detector west

You should by this stage have a good feel of the way in which the tuning of the parasitic dipoles interact. It does not seem possible to optimise forward signal and minimum reverse signal with a single combination of Cd and Cr.

The polar diagram for the ground wave signal will probably look like Fig 5. This diagram, though adequate, has a rather wide forward lobe and was found to have poor front-to-side ratio which allowed strong European signals to cause interference when beaming north or south. The antenna can be retuned to improve this as follows.

With the same detector arrangement as before, switch the antenna to beam at right angles to the detector and look at the side signal. Tune Cd for a minimum, switch to the reverse direction, the field strength should

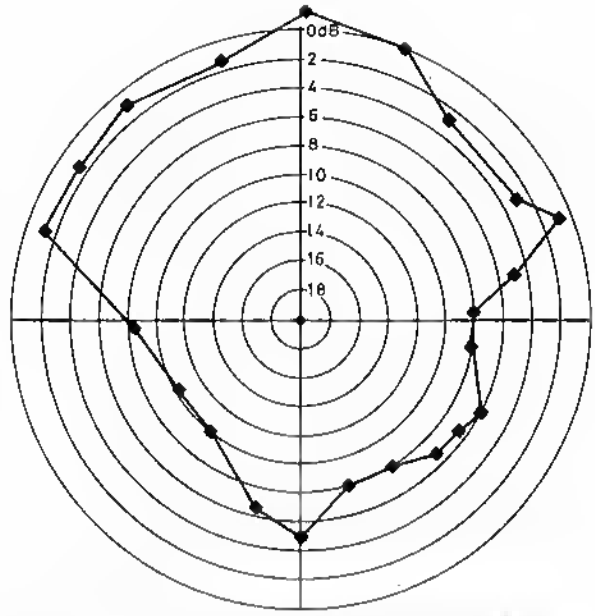


Fig 5. Polar diagram taken at 3km range groundwave after the first stage of tuning. The uneven nature of the plot is a consequence of the topography of the area

be close to the minimum for this direction too. Switch the antenna to beam away from the detector and set Cr for a minimum. This sequence can be repeated until the side minima and the reverse minimum seem to be as low as possible. There seem to be four possible settings of Cd: max forward, min reverse, and two min side settings. The polar diagram will now have changed to Fig 6. Superimposed on Fig 6 is a polar diagram plotted from [4]. There are minima in the pattern in the second and third quadrants. The array could be tuned to give minima in these directions but this has not been attempted. Finally, check the swr and, if necessary, add a capacitor to reduce any unacceptable swr.

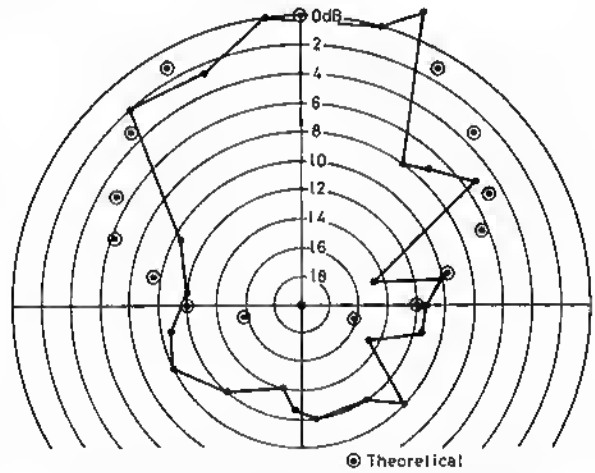


Fig 6. An improved 3km polar diagram achieved after retuning the array as described in the text for minimum side radiation. The uneven nature of the plot is due to the topography of the area. A theoretical polar diagram for a 4 element phased array is included for comparison

Results

At this stage in most antenna articles an impressive list of rare dx appears. In this case, as this antenna is unusual and few amateurs have had experience of such an array, a different approach is required. As directional checks can be made in a few milliseconds far more checking of direction effects is possible than would be the case if a rotary beam were in use (should be good for contests!). Headings to minimise interference for reception and to maximise transmitted strength are often different, especially on such a crowded band as 10MHz. Rapid switching allows the user to take advantage of this. For the four optimum directions the array behaves as expected, for intermediate directions, however, two headings

(Continued on page 29)

Technical Topics

Pat Hawker, G3VA

ALTHOUGH I RECOGNISING that many amateurs and professionals are convinced that the future of radio communications and broadcasting equipment is firmly in the direction of all-solid-state – see, for example, the view of Joseph H Johnson of Microwave Modules & Devices that the time is rapidly approaching, when vacuum tubes will no longer be required. (*TT* February 1987) – I remain convinced that amateurs should not be in any hurry to phase-out completely thermionic devices for such applications as rf power amplification. Unfortunately, marketing people, as noted later, have convinced many "customers" that thermionic devices are unreliable and obsolete, or virtually so, even at powers in the kilowatt range.

High-power solidstate – to be or not to be?

A few months ago, Kurt Grey, VE2UG, noted the comment of K Weiner, DJ9HO, on page A.I.1. of the *UHF Compendium* that "due to financial considerations valves will remain with us in uhf power amplifiers for quite some time". But it is not only from financial considerations that we need to recognise that *for amateur applications* there are other positive advantages. VE2UG puts it bluntly:

"The amateur fraternity and some other users should recognise the true price-tag attached to some of the super-duper, hi-tech gear. Maintenance free? Who is kidding who? Recognise the need for transient protection to be applied to power lines; this can be complex and costly.

"Then something goes wrong. The solidstate output module(s) is knocked out. Was this due to power transients, lightning, failure of mismatch protection? One can seldom be certain as to the cause. Unlike the pull-out, plug-in of valve replacement, the solidstate transceiver usually has to be returned to the supplier. Transistor replacements thus involve not only the high-cost devices but also transportation cost, servicing costs and loss of the use of the equipment over extended periods."

Broadcasters tend to be attracted to solidstate for reasons that have little bearing on amateur operation. Few amateurs, for example, are concerned about the energy-consumption costs of operating a high-power transmitter over many hours daily. A year or two back, the Canadian CBC organisation installed and brought into use the world's first 50kW solidstate mf/a.m broadcast transmitter and achieved an energy-cost saving of $12,300 (energy cost $0.05/kWh) in a period of nine months. CBC regard their experience with this type of technology as "quite favorable, both in terms of performance and maintenance". But they note that in 12 months of operation eight power fets and two or three fuses have been replaced. Major problems were encountered when the prototype transmitter was switched on for the first time: six toroid pot cores and about 40 power fets had to be replaced. The failure of the fets was traced to the weakness of the isolation seal pad washers, later replaced by washers containing glassfibre to increase the stiffness. Sporadic failures of some pa modules occurred because of overheating at a time when the building's ventilation system was incomplete.

Customer education

At a recent IEE international conference, Radar-87, the keynote address, given by David Barton of ANRO Engineering Consultants, USA, noted that 90 per cent of major radar research and development projects have been ending in failure to deliver a usable product. He put much of the blame on the customers (military and civil) demanding only the latest technology. He stressed that:

"The role of consumer education in radar is just as important as in matters of household safety, diet and health. But who is to perform this service? Medicine in this past century had more than its share of snake-oil salesmen. As professionals we must make sure that we are not performing the same dubious role for our users. The user must be assisted in selecting and specifying radar functions which are appropriate to his system requirements." For radar, I would suggest one could simply substitute amateur radio!

David Barton also expressed some pertinent opinions in respect of rf power generation: "Throughout this (postwar) period, the attempt was made to get as much power as possible out of a single tube, and to use multiple tubes only when absolutely necessary. Presumably this was the result of cost considerations... As a result of the pressure for high output powers, tube designs were pushed to the limit of emission density, heat dissipation and breakdown voltages, with resulting reliability problems which remain today. Low reliability also is traceable to the small production quantities of these tubes.

"About 10 years ago, advances in transistor technology made it possible to consider development of solidstate radar transmitters. Even with advanced devices, power levels were (and are today) pitifully low in microwave bands. But the solidstate industry was not discouraged, and their marketing efforts found assistance from the reliability engineer. The deficiency in power output was presented as a fundamental advantage: many sources would have to be combined, giving great redundancy and reliability. Radar customers who previously would not accept dual-tube transmitters, now began to insist on modular transmitters having hundreds or thousands of solidstate sources in the name of reliability. Even with its multiplicity of modules, the usual solidstate design cannot compete economically with tubes unless the radar waveform is changed to permit use of very high duty factors. As a result there are radar systems being designed today in which the high-energy pulse, needed for maximum detection range, consumes almost half of that range as dead time..."

While these considerations mostly apply specifically to radar, there are, I would suggest, lessons to be learned. For instance, it shows the reasons why some of the older (1950s) valves are less vulnerable to flash-over, inter-electrode shorts etc than the later ceramic tetrodes. The note from Percy Greenwood, G2BUJ, on the 4-65A (QY3-65) power tetrode in the October *TT*, has prompted John Roscoe, G4QK, to comment: "I preferred the more powerful QY3-125A (4-125A). I had a pair in 1953, used one at a time, and they remain enshrined in my memory as the best valves I ever handled. I paid £5 each for them, slightly used, and later sold them to Rowley Shears, G8KW, probably for the same price."

Electronically variable attenuator

Arising out of the recent discussion on variometers (presumably one of the backward-looking topics that have upset some readers) I included in the September *TT* an item on a forward-looking linear variable inductor as proposed by A S Kislovski of Hasler Ltd. This in turn prompted several accounts of how similar or related techniques are being used successfully in existing solidstate equipment.

Mike Perks, ZS6BIM, of the South African firm Grinaker Electronics, writes to point out that in the late seventies he used a similar technique in the design of an electronically-variable attenuator to control the drive to a solidstate 500W hf linear amplifier, including its use in the automatic level control (alc) system. With the permission of Grinaker Electronics, ZS6BIM has sent circuit details of the drive system from which I have extracted only the part appertaining to the variable attenuator: Fig 1. ZS6BIM writes: "The attenuator circuit provides about 30dB control over 1·6 to 30MHz with low distortion at an operating input of 5 to 20W and with the power applied to the variable inductor first attenuated by R126, R127 and R129. The circuit operates by increasing the transmission loss with the variable series inductor. The fixed input attenuator optimises the source impedance for the variable attenuator and provides a well-defined input impendance for the driving source. The additional components

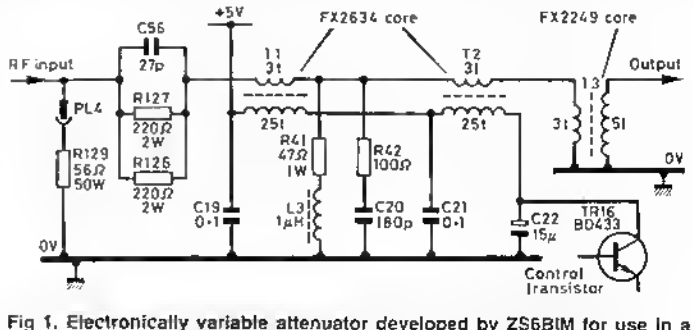


Fig 1. Electronically variable attenuator developed by ZS6BIM for use in a solidstate 500W hf linear amplifier built by Grinaker Electronics

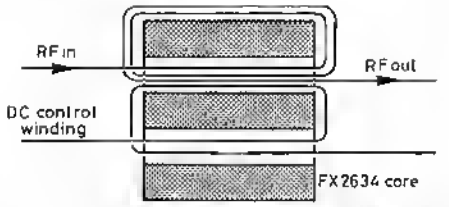


Fig 2. Balun core winding method. Note that the rf winding is wound through the one balun core aperture only

R41, L3 and R42, C20 compensate for performance roll-off at the low and high end of the band.

"Using a 25-turn control winding, full attenuation would occur with a current of 400mA at 30MHz, falling to less than 100mA at 1·6MHz. As maximum control current corresponds to maximum attenuation, in practice only a small current flows. The problem of preventing coupling of the rf and control windings is solved by winding the balun core of T1 and T2 as shown in Fig 2."

QRP power boosters

Listen around 3.540/3.41kHz and one soon discovers that a few hundred milliwatts of rf can provide a reasonably-steady signal when band conditions are stable. But those signals tend to be terribly vulnerable to fading conditions that often take them below the high noise level of electrical interference seemingly inevitable in urban and suburban areas on this band.

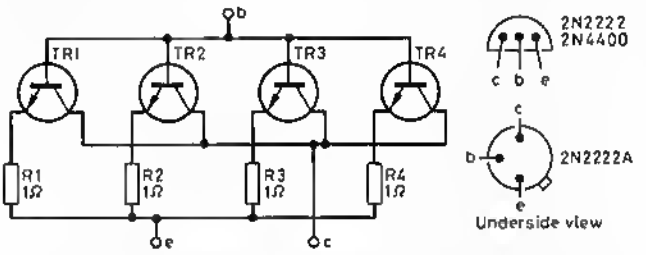


Fig 3. Use of four transistors connected in parallel. R1 to R4 serve as equalizing resistors to form a ballasted power block *(QST)*

As Doug De Maw, W1FB, puts it in "Low-cost QRP power boosters" (*QST* July 1987, pp30-4): "If you're working QRP, a signal gain of 10 to 13dB can mean the difference between being copied and having your signal lost in the mud." His article shows how on 3·5 and 7MHz, numbers of low-cost transistors can be used in parallel to raise the output from a milliwatt rig. For example, four 2N4400 or 2N2222A transistors can be connected in parallel for rf power amplification provided that low-value equalising ballast resistors are connected in the emitter leads to form, in effect, a ballasted power block. Four 2N4400 devices connected as in Fig 3 can deliver 1·5W of 7MHz power in Class C with a 50 per cent duty cycle. Some semiconductor firms, such as Motorola, market such power blocks as ballasted transistors or b.e.t. (balanced-emitter devices). The low-value emitter resistors not only tend to balance the power in the transistors but also prevent thermal runaway – the phenomenon that affects bipolar rf power transistors due to excessive junction heating which, once started, continues to increase the current until the junction is burned out. Thermal runaway can be induced by operating a transistor

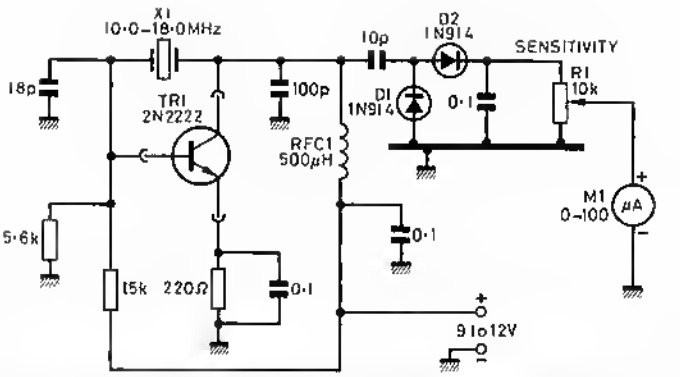


Fig 4. Tester used when matching transistors for use as in Fig 3. Use a translator socket to facilitate plugging various transistors into circuit. R1 is 10K linear carbon composition control. RFC1 can be a small rf choke of any value from 500µH to 2·5mH. M1 could be 50, 100 or 200µ ϕob

power amplifier into an inadequately matched load. A b.e.t. device has the emitter resistors formed directly on the silicon chip together with the multiple transistors, but there is no reason why the same technique cannot be used with discrete devices. Matched transistors can be selected using the test jig shown in Fig 4.

Fig 5, taken from W1FB's article, shows how up to eight devices can be used in parallel/push-pull configuration to provide a useful 3W output from 150mW drive, useful either for QRP or as part of a higher-power exciter. Alternatively, a single Motorola MRF475 or roughly equivalent Japanese 2SC2092, as widely used in cb rigs, can provide 5W rf output from 250mW drive in the arrangement shown in Fig 6. In his *QST* article W1FB provides constructional details, including pcb lay-outs, although stressing that it is meant primarily as an ideas source for those who like to

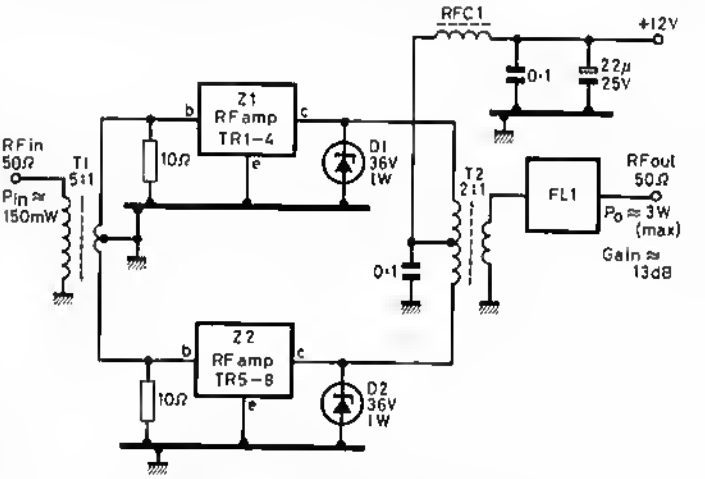
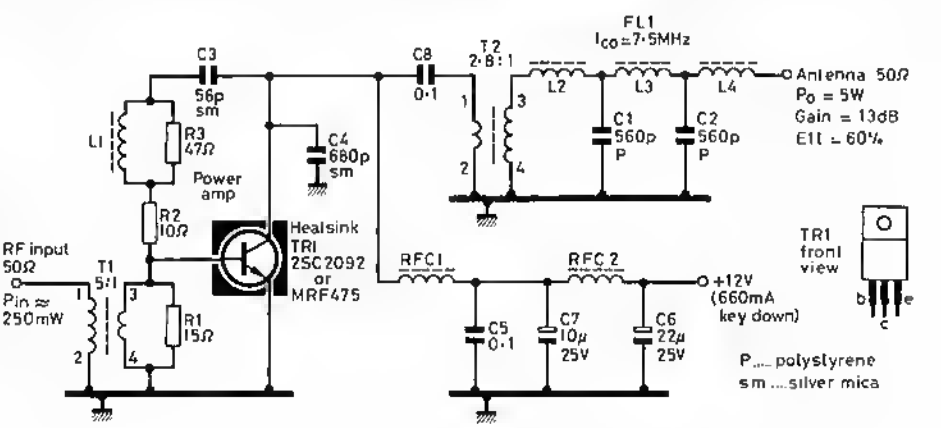


Fig 5. How two power blocks may be combined to form a push-pull 3W amplifier. Zener diodes D1 and D2 may be used instead of the ballasting resistors if matched transformers are used

Fig 6. 5W amplifier using cb type transistor. C5 and C8 are disc ceramic. C6 and C7 are tantalum or electrolytic. R1, R2 and R3 are 0·25W carbon composition resistors. Silver-mica capacitors may be substituted for polystyrene (P) types. Impedance transformation ratios are shown above T1 and T2. L1·0.22µH inductor. Small rf choke of 8 of No 24 enam wire on an Amidon T-37-6 toroid. L2, L4·0.8µH inductor. 12t of No 24 enam wire on an Amidon T·50·2 toroid. L3·1.67µH inductor. 18t of No 24 enam wire on an Amidon T-50·2 toroid. RFC1·2.8µH choke, 24t of No 26 enam wire on a Amidon T·50·2 toroid. RFC2·42µH choke. 10t of No 26 enam wire on an Amidon FT·37·43 toroid. T1·Primary has 16t of No 26 enam wire on an Amidon FT·37·43 toroid. Secondary has 6t of No 26 enam wire. T2·Primary (Q1 side) has 9t of No 24 enam wire on an Amidon FT·50·43 toroid. Secondary has 15t of No 24 enam wire (W1FB, *QST*)



build their own equipment. He concludes with an interesting, if reflective, challenge: "Who will be the first to build a 25W rf power amplifier from a bag of 2N2222As? To that end I recall laughing in 1952 at my friend John Baumler, W8UUN (now a silent key), who built a 400W p.e.p ssb amplifier around six miniature 6CL6 tubes in parallel. I found it necessary to eat a large serving of crow after I saw (and heard) his 4 by 4in linear amplifier in operation!" Nobody is likely to call WIFB non-progressive for mentioning the wonders of valves – or are they?

A variable wide/narrow bandwidth ladder filter

The "front-end" of the "ultimate" hf communications receiver designed and built by Ray Hawgego, G4DTC, was described in the December *TT* (pp915-7). It was mentioned then that G4DTC uses a 4·433MHz ladder filter based on low-cost Pal colour television crystals. His filter was developed after many hours of experiment specifically for this receiver, since no designs for "wideband" ladder filters suitable for the reception of a.m signals appeared to have been published. The filter that has resulted would, however, be suitable for any receiver intended for a.m/ssh/cw/rtty reception, since the 3dB points can be varied from 4·35kHz down to 600Hz. The work has also brought out several points of interrest about ladder filter techniques generally. The nine-crystal filter is shown in Fig 75. G4DTC writes:

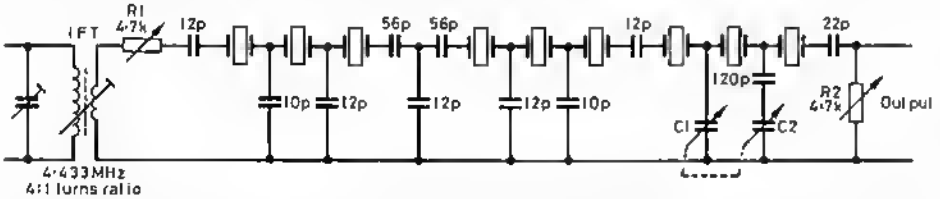


Fig 7. Veriable selecivity ladder filter using low-cost Pal colour television crystals developed by G4DTC for his "ultimate" receiver

"(1) The bandwidth is determined entirely by the "vertical" capacitors. If, however, these are reduced below about 10pF, the bandwidth begins to narrow rather than widen. The maximum bandwidth achieved was about 4·5kHz. This can be widened by placing resistors (1kΩ to 10kΩ) across the capacitors but this increases insertion loss.

(2) Virtually any combination of crystals and capacitors produces a filter of some sort. However, the published equations give optimum shape.

(3) Terminating impedances affect the passband ripple, not the bandwidth.

"The filter shown in Fig 7 gives continuously-variable selectivity over the range 4·35kHz to 600Hz and is much easier to construct than some. It is basically a six-pole roofing filter followed by a variable three-pole filter. It should prove reliably reproducible. When the crystals were swapped around there was no obvious difference. The crystals used were Philips HC18-U units supplied by Sendz Components of Shoeburyness at 50p each. In a batch of 10 they were all within a range of 80Hz. Crystals in the large case style (eg HC6-U) tend to be about 200Hz lower.

"This filter really does work well. The maximum bandwidth gives pleasant a.m with 'razor-sharp' selectivity. Set at a 2·2kHz bandwidth for ssb, it gives total suppression of the opposite sideband."

G4DTC provides the following details of the filter and its performance:

C1, C2 is a 60 + 142pF miniature tuning capacitor as found in most cheap portable broadcast receivers, or Maplin FT78K. Set integral trimmers for maximum bandwidth when capacitor plates are fully unmeshed. Set R1 for best compromise between insertion lose and shape factor, 2·5kΩ nominal. Set R2 for best compromise between minimum bandwidth and insertion loss, 1·2kΩ nominal.

The following specification should be achievable:

C1, C2 plates unmeshed: 3dB points at 4,437·25kHz and 4,432·90kHz, bandwidth 4·35kHz.

C1, C2 plates half-meshed: 3dB points at 4,434·0kHz and 4,432·90kHz bandwidth 1·10kHz.

C1, C2 plates meshed: 3dB points at 4,433·5kHz and 4,432·90kHz bandwidth 600Hz.

Insertion loss in passband: Maximum (R1 2·5kΩ, R2 1·2kΩ) 10dB. Minimum (R1 0Ω, R2 1·2kΩ) 6dB.

Passband ripple 1–3dB (dependent on R1). Ripple reduces with bandwidth.

Stopband attenuation: beyond range of measurement (better than 60dB).

–20dB bandwidth typically 1,000Hz wider than the –3dB bandwidth.

Details of G4DTC's i.f amplifier, detector, age and S-meter circuitry, based on Plessey integrated circuits and discrete semiconductors, and also the hfo/carrier injection oscillator, will be given another month. □

AN ELECTRICALLY-STEERABLE VERTICAL PARASITIC ARRAY FOR 10MHz

(Continued from page 26)

will often give the same result, but equally the corresponding reciprocal directions both tend to reduce strength as Fig 6 would suggest. The 90° width of the forward lobe allows the array to cover 360° with the four positions. Very high angle signals tend to exhibit less directionality than the more distant stations, but nevertheless the directionality on European signals is impressive. Directional effects were examined by asking for and measuring the comparative directional signal strength reports from a variety of stations at known locations (VK, W2, W7, JA and European). These results are shown in Table 2. Accepting the qualitative nature of many S-meters/signal strength estimates, a consistent pattern of strong directionality emerges. The array is particulary effective on long-distance paths such as the G–VK/ZL and the polar G–W7/W6.

Table 2. Comparative signal strength reports. For each of the four directions, measurements were made for the four beam headings. An estimate from the polar is included for comparison (4dB per S-unit)

Direction of signal	Relative beam heading			
	Forward	Reverse	Left	Right
North	9	3	4	5
South	9	4	4	6
East	9	6	7	6
West	9	1·5	4	2·5
Ground-wave	9	6	6	6

Other bands

This array is a single-band antenna which can readily be scaled for other bands. A taller support would be required for 7MHz about. 50–60ft, or the elements could be bent more in the vertical plane.

Conclusion

The construction of this type of antenna system is an interesting exercise in itself and the effort seems to be worthwhile. The cost of this array is a fraction of the cost of a rotary antenna of comparable performance, and most of the components are simple and inexpensive.

The key features are: inexpensive, directionality, gain over simple verticals and dipoles, rapid switching, reduced interference to the primary users, and an instructive project.

I will be pleased to discuss this array if readers write and enclose an sae, or if they call me.

Finally, thanks to the many stations who helped with comparative reports, and particularly to G3PLP, W2GDV and SM3CIQ.

References

[1] *ARRL Antenna Book* (1976) 13th ed, p200-1, "40m sloper system".

[2] *ARRL Antenna Anthology* (1976) p114-9, "Simple arrays of vertical antenna elements".

[3] *ARRL Antenna Anthology* (1976) p119-22, "360° steerable vertical phased arrays".

[4] *ARRL Antenna Compendium VI* (1985), p67-71, "A hf phased array using twisted wire hybrid directional couplers".

[5] *Vertical Antenna Handbook*, P H Lee, *CQ*, Chap 10, p69-74, "Three-element directional array".

[6] *HF Antennas for All Locations*, L A Moxon, (1982) p184-91, RSGB.

[7] *ARRL Antenna Anthology* (1976) p70-2, "A convenient stub tuning system for quad antennas". □

THE 1987 HF CONVENTION

Attendance at this year's HF Convention was slightly down on last year due to an unfortunate clash with a couple of mobile rallies. However, there were treats in store for those who made it to the Belfry Hotel near Oxford. Major John Brown, the man who designed the B2 and other spy sets of the second world war, described the equipment and antennas, and many tricks of the trade such as how, during the Norwegian campaign, equipment had been hidden in sacks of potatoes and drums of oil. As well as some fascinating slides, John also brought along Polish, British and American clandestine transceivers. He also spoke about the equipment and antennas used at the receiving stations in the UK and Egypt, including the use of the well-loved AR88 and CR100 receivers. John had only recently given this talk in Holland and in Denmark, and it was a privilege to have him at the HF Convention.

The convention proceedings had, in fact, started the previous day when five hopefuls underwent the FCC tests to obtain or upgrade their USA licences. That evening some 40 or so dxers heard Hans, DK9KX, describe his operations from Gloriosa, Sao Tome and other rare spots.

Back to the Sunday, and David Yates, G3PGO, used scale models of antennas to demonstrate the angle of radiation of quads, Yagis and other arrays. His demonstrations of the gain and front-to-back performance of phased vertical arrays were particularly well received, as was the demonstration of the current distribution in verticals of various heights, both with and without capacitance loading. Unfortunately there was no time for questions, but as David gives this talk at various clubs from time to time there may well be future opportunities to hear more of him.

The static displays were as popular as ever, with many groups being represented. John, ON4UN, gave demonstrations of his computer software for propagation predictions and for antenna calculations. The Chiltern Amateur Radio Club once again ran the demonstration station, with demonstrations of QRP and of packet radio, together with an interesting comparison between a triband beam and one of the better multiband verticals. The constructional booth, run by the G-QRP Club, had a steady stream of interested enquirers, demonstrating that home construction is still alive and well. Talk-in facilities were provided by Mid-Thames Raynet, who also ran the car boot sale. The dx quiz was won for the third year running by Ghis, ON5NT, despite instructions to G4DYO, editor of *DX News Sheet*, to prevent this from happening! How could a Belgian amateur possibly know what ROTAB stands for? The cw pile-up competition was won by Dave Lawley, G4BUO. Every attendee at the convention had been given a prize draw ticket, and the draw was held after the trophy presentations. Particular thanks are due to Lowe Electronics and to SMC Ltd for donating prizes for the draw.

Einar, LA1EE, was the principal guest at this year's convention. His talk about the Peter I Island dxpedition, illustrated with a magnificent collection of slides, was an unforgettable experience. Einar described how the dxpedition had come about in the first place, and the logistics required in co-ordinating gear from Japan, Europe and the USA, plus operators from Europe, to arrive in New Zealand in time to meet the *Aurora*, the ship that was to carry them and a group of scientists to Peter I Is. The ship was actually in the Antarctic to support Monica Christensen, a young Norwegian explorer, in her bid to follow in Amundsen's footsteps to the South Pole. Although the ship was supposed to act as the communications relay between the explorers and Norway, it had been out of touch since depositing them in Antarctica, due to high QRN on all frequencies. It took the radio amateurs to trace the problem to the switching power supply in the ship's satellite communications unit. Later, when communications with the expedition had to be conducted by cw due to poor signal strengths, the radio amateurs were called to help out again. Later still all the "professional" radio equipment on the ship went faulty and 14MHz became the main link back to Norway and the waiting press and public. The result was that, even before the Peter I operation started, LA1EE and LA2GV had already become celebrities in their own country. Sad to say, Monica Christensen had to turn back before reaching the Pole.

At the end of his talk, Einar presented the convention organisers with a piece of stone from Peter I Island, and this was raffled, with the proceeds going to the RSGB's new dxpedition fund. The stone was won, appropriately enough, by Hazel, G4YLO, who had been one of the first UK amateurs to work the expedition on the various bands and modes. The entrance charge to the convention had been raised mainly in order to bring Einar over from Norway. Although some criticism of the higher charge was heard, those who packed in to Einar's presentation were unanimous in agreeing that it was worth every penny.

A dxers buffet took place after the convention at the home of Don, G3XTT. The roll-call for this event included amateurs from JA, ON, DL, LA and VU, in addition to G, GM and GW. It is clear that the convention is becoming more international each year which, after all, is a major aspect of what HF amateur radio is all about. The next convention is on Sunday 25 September 1988. The HF Committee extends its thanks to all who made the convention such a success.

PRESENTATION OF AWARDS BY JOAN HEATHERSHAW, G4CHH

Left to right: R Brown, G3LQP, ROTAB Cup; Lichfield ARS, Northumbria Trophy; S Taylor, G4EDG, the T E Wilson G6VQ Cup

Presentation of Commonwealth Golden Jubilee Contest awards. Left to right: C A Bradbury, BRS1066, leading receiving station; A J Slater, G3FXB, leading G station; and a special award to Dud Charman, G6CJ. A J Slater also received the Col Thomas Rose Bowl and the L H Thomas Trophy



Left to right: D Andrews, G3MXJ, Braaten Trophy; Verulam ARC "A", HF NFD Shield; T K Raven, G4ARI, 1930 Committee Cup



Left to right: A Gray, G4DJX, G3XTJ Mamorial Trophy; Three As Contest Group, Bristol Trophy; G Timbrell, G4STH, Whitworth Trophy



Left to right: M J Hickling, G4WQN, 2QT Cup Winners Cup; Marple CC, Edgware Trophy; H Claytonsmith, G4JKS, Houston Fergus Trophy



Left to right: P Miles, G3KDB, Founders Trophy; Marple CC, Gravesend Trophy; C Burbanks, G3SJJ, Somerset Trophy



Left to right: W K Ginder, G3NAS, Powditch Transmitting Trophy; G4FAM and G4BUQ on behalf of Gravesend RS, G6ZR Memorial Trophy; G Millar, GM3UM, Maitland Trophy

SCOTCON 87

The Scottish Amateur Radio Convention, SCOTCON 87, held at the Magnum Sports and Leisure Complex, Irvine, Ayrshire, on 13 September 1987, was organised by four Ayrshire clubs: the Cunninghamme & District, the Ayr ARG, the Kilmarnock & London Club and the Cumnock Club. The Magnum Centre, one of Europe's largest sports complexes, was a magnificent setting for the convention, which was attended by over 1,300 amateurs. The organising committee led by Bob Low, GM0ECU, is to be congratulated on a first-class show which attracted visitors from England, Ireland and beyond.

The show had an excellent representation of traders from all over the country, and of course the RSGB bookstall was in full swing throughout the day. The RSGB contingent was led by our President, Mrs Joan Heathershaw, G4CHH; the Scottish zonal council member and executive vice-President, Frank Hall, GM8BZX; and supported by all the Scottish regional representatives.

During the event Joan Heathershaw presented various trophies: the Glenrothes & District ARC received the Scottish NFD Trophy and the Frank Hinsen Trophy for the leading station on 144MHz, and Jim Johnstone received the A O Milne Trophy for the leading non-G station in the ARRL Contest. Frank Hall presented the Jack Wylie Trophy to Mr Les Hamilton for his work in the hf field over the past year; and Chris Tran, GM3WOJ, received the Jock Kyle Trophy for his work on 50MHz and the Rosemarkie Beacon, GB3RMK. Also on display was a new Scottish trophy, the Windy Yett Challenge Trophy for the leading Scottish station in SSB Field Day (Open or Restricted); this will be presented for the first time after the results of the 1987 event are known.

The bevy of raffle ticket sellers who attracted a record number of purchasers

There were three lectures: "Clandestine radio on the Burma/Siam Railway" by Tom Douglas, G3BA; "Propagation", by Ray Flavell, G3LTF; and "The secret diary of a salty ham" by John Crawley, GM3IDX. All were well attended.

Talk-in was provided by the local Raynet group which did a fine job and didn't manage to lose anybody.

Members of the Glenrothes & D ARC with Joan Heathershaw after receiving their trophies

Joan Heathershaw and Tom Wylie display the new Windy Yett Challenge Trophy

Les Hamilton, GM3ITN, receiving the Jack Wylie Trophy from Frank Hall

The Jock Kyle Trophy being presented to Chris Tran, GM3WOJ

NEWS BULLETIN

RSGB 75th Anniversary

It's 1988 and the start of the RSGB's 75th Anniversary. We've been planning a number of events in which members can take part, most of which will take place during the latter part of July. The purpose of this special feature is to give you a brief outline of the type of events we have in mind and to ask you for your ideas of events which can be held locally and organised by your own club, society or group.

As we've just said, the main events will take place in late July and full details of those events is given below. However, 1988 will also be the year in which the Society makes a concerted effort to promote amateur radio to young people and here is one area in which all clubs, societies and groups can help.

"Youth into Electronics via Amateur Radio", or "Y.E.A.R '88", is the title of the programme designed to bring more young people in to the hobby and hopefully, steer them into a career in electronics. In his opening speech at last year's National Convention, Mr John Butcher, MP, Parliamentary Under Secretary of State for Trade & Industry, said that there was a definite shortage of young people taking up a career in electronics in the UK and he felt that amateur radio was one way in which they could take the first step towards such a career. He also said that the DTI would be talking to the Society with a view to promoting jointly, the "Young Radio Amateur of the Year Award". Preliminary details of this award are given on page 35 and we may publish the text of DTI's press release next month.

What can you do?

First of all, in order to publicise the event to maximum effect, we'd like you to find some space in your club's newsletter or magazine to list the details of the 75th Anniversary celebrations given below and in the "Events Diary". In addition to this, if your club intends to celebrate the 75th with an open day or public demonstration of amateur radio, we'd like you to approach your local newspaper and other amateur magazines for additional coverage.

Secondly, the Society has been negotiating with the DTI concerning a special "75" prefix for special event stations that will be active during our 75th anniversary year. It was hoped that we would have some positive news on this by the time we went to press but there are still a number of points which need clarification. In principal, we are looking for a "GB75" prefix for all special event stations which would have some direct link with the 75th anniversary celebrations and which would promote amateur radio to young people. The Society is hopeful that the Headquarters station will be on the air with a special callsign from the beginning of the year.

Thirdly, we'd like clubs to run open days at their own meeting places or to take a working station out to schools, colleges and other youth orientated areas with a view to encouraging more youth into the hobby. We'll be putting together some guidelines and an information pack to help you with these projects and we are also in the process of preparing a new recruitment video to attract youngsters into amateur radio as a basis of a career in electronics. Copies of this video will be sent to all clubs as another aid to promotion on a local level.

The main celebrations.

The main celebrations will start with the National Convention at Birmingham's NEC. This will be a three-day event held on Friday, Saturday and Sunday 15, 16 & 17 July. It will consist of a bigger and better trade exhibition together with a display of amateur radio equipment through the ages and social events held in the evenings in the grounds of the NEC complex or in one of the on-site hotels. Accommodation will be offered in the Metropole Hotel at a very competitive rate for the full period or on a daily basis. There will be a special 75th Anniversary Luncheon on the first day of the convention and members will be able to purchase tickets for this on a first-come first-served basis. More details later.

RSGB Headquarters will then close for one day, Monday 18 July, to allow us to transport the exhibition back to HQ and to prepare for the "Open Days". In the past, many members have asked if it would be possible to open Headquarters to allow them to see how we operate and what work is involved in running your Society. In response to those requests, and as part of the 75th Anniversary, we've made arrangements for Headquarters to be open on three days - Tuesday, Wednesday and Thursday 19, 20 and 21 July from 10am to 4pm each day. In order to minimise the disruption to work and to judge the number of visitors we are likely to get, we will be issuing free tickets - again on a first-come first-served basis - to all those who would like to visit us. We will be conducting tours of the building in parties of ten and you will be able to see what goes on in Headquarters and have the chance to operate the HQ stations "GA75HQ and GB75HQ". It is hoped that we will also be able to mount a small display of some of the archive material held at Headquarters as well as historic radio equipment.

The next event is a Data Symposium. This will be held at Harrow School on Friday and Saturday 22 and 23 July and is designed to provide not only a comprehensive lecture programme but, hopefully, a number of demonstrations of all the various forms of data communication in use by radio amateurs. It is an ideal opportunity for you to hear what is happening in the world of data communications and to voice your opinions. All of the specialist data communication groups will be invited to take part in the lecture presentations and visitors will be able to gain first hand knowledge of this fascinating

aspect of our hobby. This will also be the first time in which all of the various groups will have had the opportunity to get together and discuss the future of data communication in the UK. There will be a special offer two-day package which will include entry to the event, tea, coffee and lunch on both days as well as overnight accommodation and dinner at a top hotel in Harrow. Alternatively, day tickets will be available in advance to include tea & coffee and lunch or, on the door each day, to include tea & coffee only. Full details later.

Sunday 24 July has been designated as "Families and Activities Day". Plans for this day are still in the embryonic stage but in broad terms, it is hoped to arrange a number of activities for both the family and groups of amateurs. Some of the ideas involve rail and river trips, club open days/parties and a chain of amateur radio stations passing a greetings message from hilltop to hilltop, much in the same way as the bonfire-type beacons were lit during some of the recent Royal occasions. More on that later.

Following a suggestion by Terry Carrell, President of the New Zealand Association of Radio Transmitters (NZART), the Society will host an International Satellite Seminar to which satellite enthusiasts from around the world will be invited. It is intended to be a melting-pot event to channel the activities of the various satellite groups into one positive direction. The seminar will be held at the University of Surrey on Thursday 28 July, immediately before the AMSAT UK Colloquium and accommodation can be provided for those who wish to stay on for the Colloquium.

This year's AMSAT Colloquium will be held on Friday, Saturday and Sunday 29, 30 and 31 July at the University of Surrey. Although it comes under the umbrella of the Society's 75th Anniversary celebrations, it will still be organised by AMSAT UK as in previous years, and is mentioned here only with the intention of putting it into perspective with the rest of the planned events. Friday 29 July will be a technical meeting of engineers and will be by invitation only. It has been planned at that time to tie in with the travel arrangements of overseas delegates who will also be attending the main Colloquium on the following two days. Anyone staying over from the International Satellite Seminar and who is not directly involved in the technical meeting, will have a free day in Guildford. The booking forms will be available from AMSAT UK c/o Ron Broadbent, G3AAJ, and the complete package will include accommodation and meals. Day tickets will be available and full details will be given later in OSCAR News and the Bulletin.

As we've said, some of the events require finalisation but, in a few months, we'll be publishing a special 4-page pull-out programme and booking form with all the costs of accommodation and packages etc, for all of the events which take place during the main celebration period. Please wait for the booking form before making any firm bookings with HQ.

Travel from overseas.

We've made enquiries with a major travel agency with regard to planning packaged flights to the UK so that overseas visitors can take part in our 75th anniversary celebrations. Their advice was that groups of amateurs from overseas should contact their own national carrier/airline, possibly through their national society, to negotiate block bookings at more favourable rates than we could obtain at this end. Once this has been done, there would be no problem in booking any of our own events packages and adding them on to the flight costs.

A full summary of the RSGB 75 Celebrations can be found in the "Events Diary" elsewhere in this Bulletin. It only remains to say that 1988 is the year in which you - our members - can celebrate with us the formation of the coordinating body for the UK amateur radio movement. To those of you overseas, come along and join in too - we'd love to see you. It is your year, so please help to make it one in which we can all be proud.

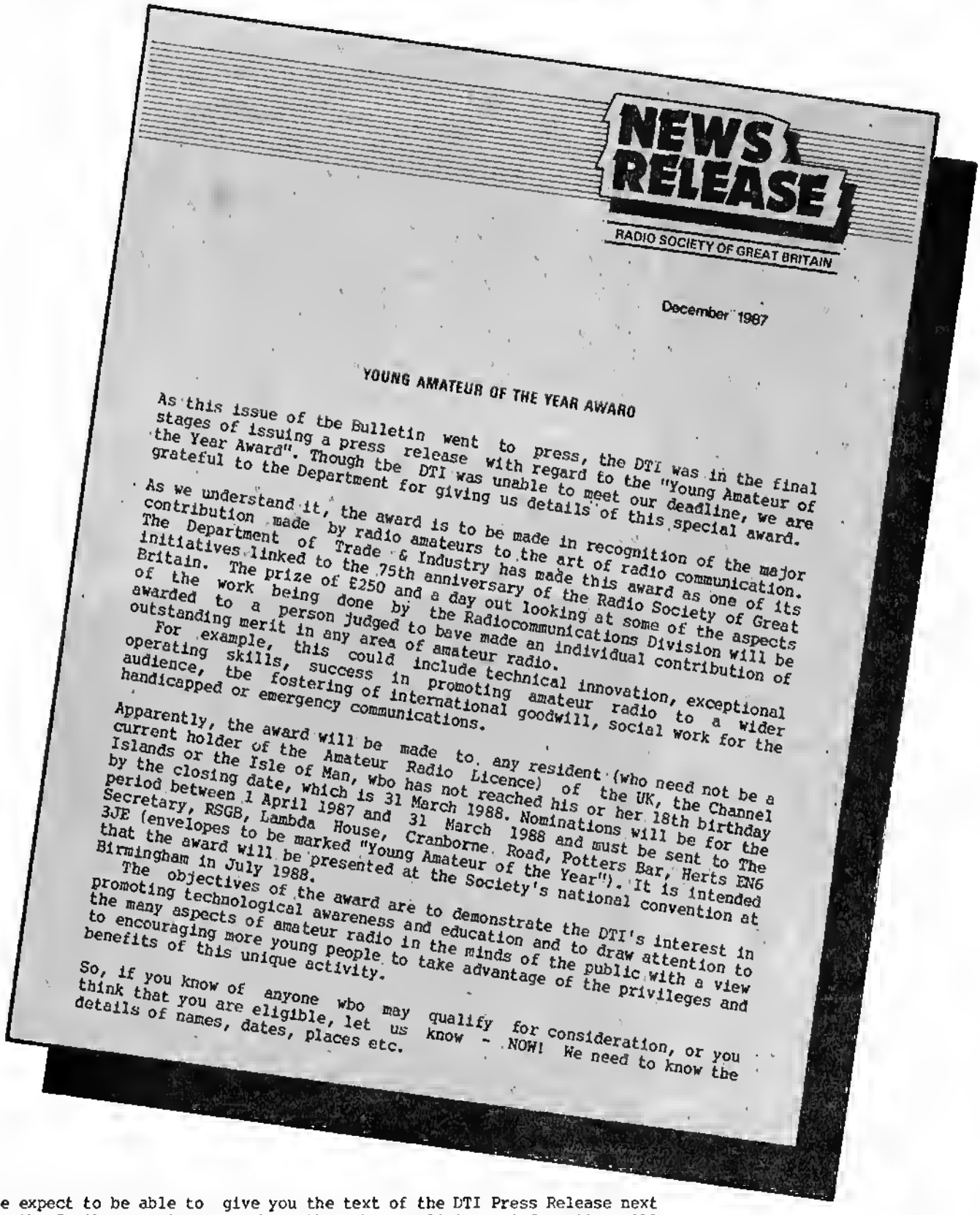
DTI HELPS HEATHERLITE:

How would you like to hear a nice story with a happy ending? We thought you would. It concerns Heatherlite Ltd, who are a British manufacturer making various bits and pieces for amateur radio use. Heatherlite were exhibitors at last year's NEC and the Society's President, Joan Heathershaw, asked Minister of State John Butcher to come and have a look at their British-made products. It seems that the conversation between Heatherlite and the Minister was largely about the problems of getting finance to develop their product range; John Butcher appreciated the problem and had words with a couple of his officials after the show to see what could be done (we tend to forget that the Department of Trade and Industry is about trade and industry as well as regulating the radio spectrum....) The DTI's Yorkshire & Humberside Regional Office were alerted and Don Stewart from their Business Improvement Service Unit (BIS) paid a visit to Heatherlite in April. He discovered that the company was struggling a bit and was unaware of the range of advice and assistance from the DTI which was available to them - particularly in regard to the tricky business of obtaining finance. Don suggested that the DTI could help with this by showing Heatherlite how to produce a business plan and a formal presentation of their market potential. On the exporting and overseas trade exhibition side of the business, the DTI could also provide assistance via the British Overseas Trade Board and Don arranged for this to take place. Finally, he got someone from the DTI's Small Firms Counselling Service to pay them a visit.

The upshot of all this was that Heatherlite made an application for support under the Feasibility Project part of the Business Improvement Service. This was accepted, and the DTI has made a generous offer of grant support for four projects which - if they're successful - will lead to some British products in a market pretty well dominated by the Far East.

Good, eh? We thought we'd write this up at some length in case there are any other British companies out there with good ideas and plans for amateur radio-related projects and who are unaware of what's on offer. Incidentally, Don Stewart has since moved on from the DTI and the BIS funds be used to help Heatherlite are only available in certain parts of the UK - in fact they're almost exhausted in Yorkshire and Humberside. However, if you're busy making wonder devices and could do with some help, don't hesitate to ask your nearest DTI Regional Office whether there is another scheme to help you - or ask for an information pack which will explain all their schemes. Remember, too, that the Small Firms Service (now part of the Department of Employment) and the Regional Enterprise Units (part of the Manpower Services Commission) both have a regional set-up and are there to provide information and guidance.

DTI ANNOUNCES "YOUNG AMATEUR OF THE YEAR" AWARD



NEWS RELEASE

RADIO SOCIETY OF GREAT BRITAIN

December 1987

YOUNG AMATEUR OF THE YEAR AWARD

As this issue of the Bulletin went to press, the DTI was in the final stages of issuing a press release with regard to the "Young Amateur of the Year Award". Though the DTI was unable to meet our deadline, we are grateful to the Department for giving us details of this special award.

As we understand it, the award is to be made in recognition of the major contribution made by radio amateurs to the art of radio communication. The Department of Trade & Industry has made this award as one of its initiatives linked to the 75th anniversary of the Radio Society of Great Britain. The prize of £250 and a day out looking at some of the aspects of the work being done by the Radiocommunications Division will be awarded to a person judged to have made an individual contribution of outstanding merit in any area of amateur radio.

For example, this could include technical innovation, exceptional operating skills, success in promoting amateur radio to a wider audience, the fostering of international goodwill, social work for the handicapped or emergency communications.

Apparently, the award will be made to any resident (who need not be a current holder of the Amateur Radio Licence) of the UK, the Channel Islands or the Isle of Man, who has not reached his or her 18th birthday by the closing date, which is 31 March 1988. Nominations will be for the period between 1 April 1987 and 31 March 1988 and must be sent to The Secretary, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE (envelopes to be marked "Young Amateur of the Year"). It is intended that the award will be presented at the Society's national convention at Birmingham in July 1988.

The objectives of the award are to demonstrate the DTI's interest in promoting technological awareness and education and to draw attention to the many aspects of amateur radio in the minds of the public with a view to encouraging more young people to take advantage of the privileges and benefits of this unique activity.

So, if you know of anyone who may qualify for consideration, or you think that you are eligible, let us know - NOW! We need to know the details of names, dates, places etc.

We expect to be able to give you the text of the DTI Press Release next month. In the meantime, we hope that this preliminary information will enable you to make a start now.

ELECTION OF COUNCIL FOR 1988:

The number of votes cast in the election of Council for 1988 are as follows:-

Ordinary Members:

J Allaway, G3FKM	1,783
G L Benbow, G3HB	812
T I Lundegard, G3GJW	667

Dr J Allaway is elected to Council as an Ordinary Member.

Zone A:

P R Sheppard, G4EJP	269
G R Smith, G4AJJ	335

Mr Smith is elected to Council as Member for Zone A.

Zone B:

J Allen, G3DOT	380
P L Crosland, G6JNS	262

Mr Allen is elected to Council as Member for Zone B.

Zone D:

J N Gannaway, G3YGF Unopposed

Zone F:

J T Barnes, GI3USS Unopposed

Zone G:

No nominations were received for Zone G.

GOT THE ANNUAL MEETING TAPED?

If you couldn't make it to London to take part in the 1987 Annual Meeting of the Society, you may be interested to know that we'll be making recordings of the meeting available this year - so you can hear it all in the comfort of your own home, as they say in the ads. Price wasn't known as we went to press but watch this space for the details.

EC DIRECTIVE ON EMC:

The Commission of the European Communities has published its proposals for a directive dealing with EMC matters; as they stand they will apply to "....all electrical and electronic apparatus and also to all electro-magnetic phenomena". According to the DTI, the earliest they could be implemented would be August 1989 and the British Standards Institution will be discussing the proposals early in January. More on this later.

FIRST RSGB STRAIGHT-KEY DAY

Report by G3VTT . . . . . .

The first RSGB Straight-Key Day was held on 10 October 1987 with an estimated 30 stations operating throughout the day. For a first event, the HF Committee was pleased to see such a high degree of involvement by so many stations around the country and with such a variety of straight keys being used.

Some stations combined QRP operation with 'SKD' and were pleasantly surprised by the number of stations contacted. Other stations used QRO, one of which used a 30W CO/PA homebrew transmitter and homebrew receiver with HRO dial. The use of QRO and the long period of operation ensured good and propagation across the UK from morning until late into the evening.

It's impossible to mention all of the various straight keys that were used but some are mentioned below.

G3VTT used a Russian key received only days before from a contact across the Iron Curtain. It keyed very well and he calls it 'Boris'. What's yours called?

G3MCK used an RAF Type 'D' key and had the bandicap of being crystal controlled too!

Chas, GW3SB had the choice of two keys, either a Royal Navy key dating from 1948 or his German Army key from wartime use.

Vic, G8QM used an Eddystone key dating from 1937 which was used to make his first QSO in June of that year.

Only one recommendation was received for the 'best fist' but, as he's a committee member, he's not going to get the award! However, the Committee feels that for both G8QM's fist and participation in the event, he should get some recognition and a suitable gift is on its way.

The Committee intends to plan another SKD event on the same weekend this year and if more letters are received with a recommendation for the 'best fist', a suitable operating award will be given. The Committee would like to thank all those who took part in the evet and took the trouble to write with their comments.

Seated at the key is G8QM, who was recommended as the 'best fist' during the recent RSGB Straight-Key Day. He runs QRP only with an Argonaut 509 and dipoles in the roof for 20m, 15m and 10m, and a combined dipole in the roof-space and small garden for 80m and 40m (also used on 10 MHz with a converted HW7 and 1W output!)

MORSE TESTS

The following list shows the dates and locations of all the available test centres from mid-February to late April as we went to press. Because of space limitations, we cannot print a complete list of all the test centres notified to us, but these can be found on the application form itself. If you want to take a test and any of the centres shown is within striking distance, send for an application form immediately. Completed applications will be dealt with strictly on a first-come first-served basis.

Morse tests will be carried out in groups of three and will be of half an hour's duration. Details of the test, the venue and how to get there will be sent to you as soon as your application has been processed and your place confirmed.

COUNTY	TOWN OR LOCATION	DATE
Nottinghamshire	Mapperley, Nottingham	13/02/88
Cleveland	Billingham	17/02/88
Greater London	Wood Green, London N22	17/02/88
Northamptonshire	Tiffield, Northampton	18/02/88
Cheshire	Macclesfield	20/02/88
Highland	Culbokie, by Dingwall	20/02/88
Co.Antrim	Ballymena	20/02/88
Mumberside	Goole	21/02/88
Avon	Redland, Bristol	24/02/88
Leicestershire	Wigston Magna	26/02/88
Hereford & Worcester	Malvern	27/02/88
Greater London	Croydon	29/02/88
Dyfed	Haverfordwest	03/03/88
Tayside	Kirriemuir	05/03/88
North Yorkshire	Scarborough	05/03/88
South Glamorgan	Barry Rally	06/03/88
Co.Tyrone	Dungannon	07/03/88
Greater London	Wanstead	11/03/88
Lancashire	Fleetwood	12/03/88
Isle of Wight	Binstead, nr Ryde	12/03/88
Lothian	Edinburgh	12/03/88
Mid Glamorgan	Rhydyfelin, Pontypridd	13/03/88
West Sussex	Morsham	13/03/88
Mereford & Worcester	Wythall Rally	13/03/88
Berkshire	Reading	16/03/88
Bedfordshire	Luton	17/03/88
South Yorkshire	Sheffield	17/03/88
Jersey	St.Clement	17/03/88
Lincolnshire	Grimshy	18/03/88
Powys	Montgomery	18/03/88
Dorset	Dorchester	19/03/88
Norfolk	Norwich	19/03/88
Shropshire	Telford	22/03/88
Grampian	Aberdeen	23/03/88
Greater London	Croydon	28/03/88
Guernsey	Guernsey ARS, St.Martins	07/04/88
Staffordshire	Stafford	10/04/88
Fife	Leslie	12/04/88
Derbyshire	Clay Cross	13/04/88
Suffolk	Ipswich	14/04/88
Lincolnshire	Lincoln	20/04/88
Greater London	Wood Green, London N22	20/04/88
Northamptonshire	Tiffield, Northampton	21/04/88
Nottinghamshire	Mapperley, Nottingham	23/04/88

We receive notification of new centres almost daily and the application form gives a full list of those currently taking advance bookings for Morse tests. There are now active test centres in 90% of counties in the UK. Those remaining are either in the process of having examiners appointed or have not yet found a suitable venue.

50 MHz IN NETHERLANDS:

The December edition of the Dutch national society VERON's magazine reports that the Dutch PTT is to allow limited facilities for 50 MHz operation by Dutch amateurs for a five-year experimental period. This is to enable propagation studies to take place in this interesting portion of the RF spectrum.

The experiment will begin on 1 March 1988, and operation will be permitted on a "non-interference" basis on frequencies between 50.00 and 50.45 MHz using CW only. The output power limitation will be 30W and there are no restrictions on antennas, although VERON is advising that only "low-gain" antennas should be used. Cross-band operation will be permitted but unmanned stations won't. Individual Dutch amateurs may apply for permits to operate at 50 MHz, which will be valid for an initial period of one year.

Great stuff, and we hope that everyone who can operate CW on 50 MHz will turn out on 1 March to welcome our Dutch friends to their new allocation. Nice to see another European government seeing the value of a 50 MHz allocation to the amateur service.

BIG CALLBOOK PLUG:

Yes, we know we had a big ad for the new Callbook in the November pre-Christmas book pull-out - and we hope that lots of you have given good homes to one already. However, we thought we might as well have another Big Plug for it this time round, just in case you missed it last time (well, it's a good excuse.....) It's the biggest and best one we've done yet, with an even bigger Member's Handbook section containing practically everything you could want to know about operating matters, the RSGB, the DTI, repeaters, beacons and about a million other things, as well as complete callsign listings as of 1 September 1987 as per the data received from RALU. Just the thing for a belated Christmas present to yourself, or cut this bit out and leave it somewhere strategic where someone who loves you can see it. Alternatively, you're most welcome to drop in at Potters Bar and get your own copy - or preferably two, one for the shack and one for the car.

Don't forget - this Call Book is the best yet and it's yours for only £6.49 for members or £7.64 for non-members, both prices by post.

50 MHz CROSSBAND LADDER RESULTS

And now, the moment you've all been waiting for - the final results of our 50 MHz Crossband Ladder. We had a tremendous response just before closing date resulting in a total of 30 stations who have submitted entries with about a 50/50 split between A and B licensees. A big thank you to all of you who took part and entered into the spirit of it. We may even consider doing it again - how about 70 MHz next time?

Callsign	Countries	Best DX	Pos
G3BDQ	25	4827km	1
G2ADR	24	8500km+	2
G4UPS	22	4550km	3
GI8YDZ	22	2214km	4
G41ZH	19	2280km	5
GW1SSQ	19	1957km	6
G4IDE	16	1729km	7
G1KDF	15	1928km	8
G0GZ1	15	1822km	9
G0IWG(G1SEP)	14	*	10
G8DKF	13	2737km	11=
G4TLY	13	*	11=
G4SJG	12	*	13
G41NL	11	1894km	14
G1SMD	11	1868km	15=
G1CWP	11	*	15=
GW1UDM	10	1766km	17
G1AHM	8	1888km	18
G4GDY	8	1711km	19=
GM4ULP	8	*	19=
GM1FSU	8	*	19=
G8PYP	7	1866km	22
G1DRG	6	1745km	23
G0DXX	6	1400km	24=
GW3WSU	6	*	24=
G6BFP	6	*	24=
G6ZHV	5	*	27
G1AHM	2	*	28=
G4IDF	2	*	28=
G6MEN	2	*	28=

After sitting at the top of the ladder for several months, G2ADR was pipped at the post last month by John, G3BDQ. John's best distance was 4827km during a crossband QSO on 50/14 MHz. Well done John, your prize will be sent off to you soon. We'll also send one of our 1988 year planner diaries to G2ADR for his record breaking DX contact with A22KZ (reported in last month's Bulletin)

In addition to John's prize for coming top of the ladder, we've also decided to award a prize to the highest placed Class B licensee, bearing in mind that Class Bs have only been on the band since 1 June last year. So the prize for the highest placed Class B licensee goes to G1BYDS.

Incidentally, remember that we mentioned the worst DX a few months ago and asked if anyone could beat it? Try this one for size. Andy, G4INL worked G8JAY over a distance of 610 metres whilst testing his Meon transverter, we hear that its working a little better nowadays!

RADIO SOCIETY OF GREAT BRITAIN

LIAISON OFFICERS

Area	Name/Callsign
ENGLAND	
Avon	S O'Sullivan, G8VPG
Bedfordshire/Cambridgeshire	J S Smith, G4KJJ
Bucks	R Ray, G3NCL
Chesbire	G R Worris, GW1ATZ
Cornwall/Scillies	A W Wammett, G3VWK
Devon	D Livsey, G4BQH
Essex	E S Whitworth, G4TUO
Greater Wanchester	R Catlow, G4ARP
Wampshire	T W Emery, G3KWU
Herefordsbire/Worcestershire	C Pettitt, GOEYO
Humberside/Lincolnshire	L D Colley, G3AGX
Kent	D Axford, G4LHU
Leicestersbire	A W Faint, G4TZY
Werseyside	M Chappell, GOGQX
Northamptonshire/Warwicksbire	J I Wopwood, GOEDT
North Yorksbire (NE of Ouse)	G R Wilkinson, G4YKO
Staffordsbire/Salop	S Poole, G3IMP
Surrey & South London	R Sykes, G3NFV
West Midlands	A Bennett, G4VVM
West Yorkshire	W Stokes, G3ZXZ
SCOTLAND	
Central Region	B J Waddell, GM4XQJ
Fife/Tayside	W Wobson, GM8KPH
Grampian	A G Ouncan, GM4ZUK
Scottish Borders	I Wilson, GM4UPX
Shetland Isles	P C Weller, GM3XOQ
NORTHERN IRELAND	
Belfast	G Curry, GI6ATZ
Co Down/Armagh/Fermanagh	D F Campbell, GI4NKD
WALES	
Wid Glamorgan/South Glamorgan	D W Phillips, GW4KQ
West Glamorgan/Dyfed	W M David, GW4WMD
BAILIWICK OF GUERNSEY	
Guernsey	S W Gibbs, GU3MBS
ISLE OF MAN	
Isle of Man	C Matthewman, GD4FWQ
ISLE OF WIGHT	
Isle of Wight	D Byrne, G3KPO

No nominations were received for those areas not listed (see September's Bulletin). The Wembership & Representation Committee has received several suggestions with regard to the splitting of some areas, where it was felt that the area would be too large for one RLO to cope with. There will be a further call for nominations in February for these new areas, together with those for which no nominations were received following the initial call last September.

Mr Neil Taylor, G4HLX was nominated unopposed for the Berksbire/Oxfordshire area but, along with a number of clubs in the area, suggested that it would be better to split this area into two separate areas. Wr Taylor suggested that be should stand down and await the call for nominations for those areas not listed above. He is willing to be nominated to serve in the new Oxfordshire area. The M&R Committee thanks Mr Taylor for his advice and cooperation.

Around the Groups

As from the March issue, this section of the Bulletin will be expanded to include more items of interesting news from clubs, groups and societies. If you have any interesting items of news, with good black & white photographs if possible, please send them direct to HQ marked "Around the Groups - Bulletin". We may not be able to use all of the items sent in because of space limitations but we'll try and fit in as many as possible.

The deadline for the March issue will be Monday 1 February latest but if you can send items in any earlier it would be much appreciated.

WAB NEWS:

Due to the growing popularity of the WAB awards, new 'firsts' continue to be achieved and this month's firsts are as follows:-

The 3,800 area Honour Roll goes to GM0BVG, on 80m SSB. This is especially noteworthy as there are only just over 4,000 areas to be worked and some of these have never been activated.

Joint honour of the Silver WABEMA Award (the WAB Expedition and Merit Award) for activating 400 areas on 80m CW goes to G5LP/M and G4WZA/M. Their claims arrived in the same post!

G4SEU receives the first Large Squares Award Class III for working 30 large squares (100km) on 70 MHz.

Finally, encouraging news of 144 MHz CW with no less than three 'firsts' for G40UT. These are the Basic Areas award for 250 areas, the Basic Bookholders award for working 100 bookholders and the Class II Counties award for working 55 counties.

Incidentally, QSL cards are not required for any of the WAB awards and the WABEMA awards are issued free of charge in recognition of the service provided by mobile and portable stations.

It is perfectly possible to collect areas without ever joining a net but if rare areas are required, you will usually find them on one of the nets which gather regularly to work portable and mobile stations and to swap the latest information. The easiest net to find is on 3,760 kHz nominal which seems to be on for most of the day, especially at weekends. There is also regular activity in the 160m and 40m bands.

Nets are even more important on VHF as signal strengths are often lower and it is more difficult to work mobiles over long distances. In general, it's best to look for activity between 144.430 MHz and 144.460 MHz. There are regular VHF nets on 144.430 MHz in certain parts of the country (except for Yorks/E.Mids, which is on 144.440 MHz) as follows:-

London: Sun 1030/Fri 2030
Hants: Tues 2030
Yorks/E.Mids: Wed & Fri 2000

There is also some activity in the London area on 432.270 MHz on Mondays at 2030. Of course, there will be other nets from time to time as mobile and portable stations activate those rare squares. If there are other nets which take place regularly, please let John, G8XTJ know about them. John is QTHR and handles the publicity for the WAB Awards Scheme. However, if you've still not had a go at WAB, you can get further information by sending a large stamped addressed envelope to:-

Brian Morris, G4KSQ
22 Burdell Avenue
Sandhills Estate
Headington
Oxford OX3 8ED

BATC NEWS:

The British Amateur TV Club is affiliated to RSGB and is the specialist interest group devoted to all forms of amateur television. It provides a number of useful services for its members including the supply of PCBs, components, camera tubes and accessories, a library of publications and videos, and assistance with TVI and RFI problems.

Membership of BATC runs from January to December each year and all members receive a quarterly magazine "CQ-TV". The present subscription rate of £6.00 pa will remain the same for 1988 and full details of membership can be obtained by sending a stamped addressed envelope to:-

Dave Lawson, G0ANO
'Grenehurst'
Pinewood Road
High Wycombe
Bucks HP12 4DD

RAYNET NEWS:

Raynet Zonal Representatives are elected for a three-year term and the Zone 3 Representative is nearing the end of his term.

Raynet Zone 3 covers Derbyshire, Leicestershire, Northamptonshire and Nottinghamshire, and Raynet members resident in the zone are invited to forward nominations for their zonal representative to "The Secretary (RAYNET)" at RSGB Headquarters. Nominations should be supported by five Raynet members who are currently registered within the zone, and they must be received no later than 5.15pm on Friday 26 February 1988. Nominations should also be accompanied by a declaration from the nominee that he os she is, a) normally resident within the zone, b) is currently a registered Raynet member, c) is a member of RSGB and, d) is willing to serve if elected. The existing zonal representative is eligible for re-election.

If more than one nomination is received by the due date, an election will be held during the month of April.

CRRL NEWS:

A few months ago we mentioned a trans-polar ski trek involving scientists from Canada and the USSR. The Canadian Radio Relay League (CRRL) has just sent us an update on the progress of the expedition and details of the amateur radio involvement.

The Federal Department of Communications in Canada has recently signed an agreement with its USSR counterpart to allow for third party traffic and receiprocal licensing between Canada and the USSR. This came into effect on 1 November 1987 and will be in existence until the conclusion of the expedition. The 'Polar Bridge' ski trek expedition will cross the North Pole from Severnaya Zemlya in the USSR to Cape Columbia on Ellesmere Is, off northern Canada, starting in February.

Six Canadian skiers, from whom four will be finally chosen, returned from a rigorous training period with the USSR team in the Tien Shan mountains of Soviet central Asia and in November, the two teams took part in another training excercise in the Canadian eastern Arctic. At that time, the Canadian amateur radio system maintained communications between the skiers in the field and the main base radio station in the north of Canada. The base station was also in touch with the principal USSR amateur station near Moscow.

(cont next page)

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Following the enthusiastic response from Canadian amateurs, Barry Garratt, VE3CDX, the well known Canadian DXer and contester, assembled an impressive team of Canadian amateurs to operate the main hase station and other elements of the ski trek radio network. This internationally important activity is an ideal opportunity to hring amateur radio into the eye of the world's media and the general public as a demonstration of its potential. The IARU, which represents some 125 member countries around the world, has offered its enthusiastic support and endorsement of the event.

BARTG NEWS:

At the British Amateur Radio Teleprinter Group's AGM, held on 7 November, the 1988 subscription rates were set at:-

UK	- £8
Europe & Eire	- £11
Overseas (surface)	- £11
Overseas (airmail)	- £16

Membership runs from January to December and all members receive four copies of 'Datacom', BARTG's quarterly journal, which usually runs to over 100 pages.

BARTG is the specialist interest group for those interested in using amateur radio with teleprinter, facsimile, packet radio, and AMTOR. The group encourages the use and development of all of these modes hy features in Datacom, contests and awards, marketing and developing specialist components and products, attending amateur radio events, dealing with members' prohlems, and working with other specialist groups in the UK and overseas. Full details of membership of BARTG can he obtained hy contacting:-

Mr & Mrs Beedie
(John GW6MOK/Pat GW6MOJ)
"Ffynnonlas"
Salem
Llandeilo
Dyfed SA19 7NP

MONSTER STATIONS AT LOCH NESS:

The Mid-Lanark ARS, in conjunction with the Scottish Tourist Board is running a series of special event stations around the Loch Ness area. The first of the stations was active in mid-December and was reported in GB2RS News. The second station came on the air on 15 December and will remain active until 11 January. It is located at the QTH of Danny, GM4LDU in Longriggend and is operational in the 80m, 10m and 2m bands using the callsign GB2LNM (Loch Ness Monster). There are plans for the station to be re-activated on two more weekends during the year hut we don't have any more details as yet.

A very special QSL card will he issued for all contacts with the special stations along with a some sort of momento in the form of a certificate, wall poster or other souvenir. This will he issued (one per person only) free of charge on receipt of an A4 stamped addressed envelope and your QSL card confirmimg the contact sent to:-

GB2LNM
PO Box 20
Motherwell
Scotland

However, these items will not he available until after 1 April. Further details can he ohtained from Danny, GM4LDU or Paddy, GM3MTH, hoth of whom are QTHR.

OZ BICENTENNIAL SPECIAL CALL:

The Amateur Radio Club "Polonia" Inc., in Richmond South, Victoria, will he running a special event station with the aim of conveying to radio amateurs around the world the significance of the Australian Bicentennial Celebrations.

The callsign will he VI88ABC and the station will he on the air from midnight on 4 January to midnight on 4 March. During that period, there will be an expedition to the summit of Mount Buller, some 1700 metres asl. Operation from the summit will commence at midnight on 15 January and will end at midnight on 28 January, a total of 14 days.

Activity will he in all the allocated HF, VHF and UHF amateur hands from 160m to 70cm using the maximum permitted power on each band. There is also the likelihood of some satellite operation.

ARC "Polonia" Inc. has been officially registered & accredited hy the Australian Bicentennial Authority with full rights to use the official ABA logo and words "Australian Bicentennial". It is also supported hy the Wireless Institute of Australia.

Special commemorative QSL cards printed in colour will he available for all contacts and QSLs should be sent to:-

The QSL Manager
ARC "Polonia" Inc
PO Box 2376
Richmond South
Victoria 3121
Australia

...including a self-addressed envelope and two IRCs, or if you prefer, cards can he sent via the bureau.

The IARU (Region 1) has awarded the Region 1 Medal to three members of the CERN Amateur Radio Club for their special work in connection with the TELECOM '87 Exhibition which was held in Geneva last October. (See December's Bulletin for full details). Seen in the photograph are (left to right): Frank Malthouse, F6DBG, Jaap den Herder, F6FYI/PA0YJ and Han Broere, PA0NOS/HB9PZT.

Helplines

DUBLIN CALLING.....

Amateur radio operators in Eire bave planned a number of special events for 1988 to commemorate the founding of Baile Atha Cliatb - or Dublin, as it is better known - 1,000 years ago. Dublin is one of Europe's oldest capital cities dating back to the arrival of the Norse on the banks of the River Liffey over a tbousand years ago. Today it boasts a population of over one million. To commemorate this millenium, a group of Dublin-based radio amateurs have organised three major events running at various times tbroughout the year as follows:-

New Year's Day - a special event station with the callsign EI1000 will be active from tbe beart of Viking Dublin between midnight and 18 bours GMT. The station will be operational on as many HF and VHF bands as conditions allow, and using as many modes as available.

St.Patrick's Day, 17 March - possibly the most ambitious undertaking of tbe year will be an attempt to make contact with stations in the many towns and cities around the globe that sbare the name 'Dublin'. The present estimate is that there are over 20 such places. EI1000 will be on the air again and contacts will be attempted using SSB and, with the help of pre-arranged skeds, a world-wide SSTV link-up. The Lord Mayor of Dublin, The Rigbt Honourable Carmencita Hederman, has agreed to take part in the excbange of St.Patrick's Day greetings witb each of the 'Dublins', if at all possible.

Tbe Millenium Birthday, 10 July, is tbe final event planned for the celebratory year and it is boped to demonstrate amateur radio in emergency and portable conditions. The station will be operational from Phoenix Park, the site of tbe birthday celebrations, and will be the last opportunity to work EI1000.

A special QSL card will be available for all contacts with EI1000 and can be obtained via the IPTS bureau or direct, on receipt of 3 IRCs.

QSL BUREAU NEWS:

Sorry, this one slipped through the editorial net.

A new QSL Sub-manager for the G3IAA to G3KZZ series was appointed some months ago and is:-

Mr N J Entwistle, GOBRM
4 Stirling Close
West Row
Bury St.Edmunds
Suffolk. IP28 8QD

Tbis regular column is proving to be very successful and we'd like to tbank all those who respond so rapidly to requests for help and advice. The first item concerns a request for volunteers to help with the Operation Raleigh programme and we're pleased to report that that yet anotber UK amateur will be taking part.....

OPERATION RALEIGH:

Last year in 'Helplines' we ran an item asking for more radio amateurs to take part in Operation Raleigh. You'll remember that although the ship "Sir Walter Raleigh" returned to Hull last year, the operation itself was still continuing out in the field.

As a result of that item and following an interview at tbe Operation Raleigb HQ, Mike Gloistein, GOHCQ has been asked to go out to soutbern Chile as a vital member of tbe team staff. He will be fulfilling the role of Communications Officer/Electronics Technician, training the venturers in tbe operation and maintenance of the equipment to he used in the field. Mike is hoping to he licensed whilst in Cbile and tbe members of bis home club, the Verulam ARC, will be monitoring his progress with interest. He also hopes to be able to make many contacts witb other stations in the UK - time permitting, of course.

ATTENTION BROADCAST SWLs:

A couple of weeks ago a handy little leaflet dropped on our desk from tbe Swiss Broadcasting Corporation. Titled "Swiss Radio International", it gives details in nine languages of the of SRI's shortwave broadcast schedule up to tbe end of April 1988 sbowing the areas of the world covered hy the transmissions and the times and frequencies of tbe various foreign language programmes. Those of you who are interested in Broadcast SWLing can obtain a copy by sending a self addressed envelope (2/3 A4) and one IRC to:-

Swiss Broadcasting Corporation
CH-3000 Berne 15
Switzerland

HELP THE ROYAL FREE:

The Royal Free Hospital in Hampstead, north London, is looking for someone who understands electronic bits and pieces and would be willing to spend a few bours each week in its electronics department dismantling equipment, recycling components, organising technical data, keeping things tidy etc. The work would be ideal for a retired electronics engineer who would like to get back into a working environment and would be prepared to work on a voluntary basis. However, you would be reimbursed for your travel and be provided with a free lunch ticket. If you think you could spare a few hours a week and would like to help a good cause, please contact:-

Alan Charles, G4ORE
tel: 01-794 0500 ext 3198

WATCH OUT - THERE'S A PIRATE ABOUT:

G1GGT has written to us saying that his callsign has heen beard operating mobile in the Hertfordshire area in the 144 MHz band. He has never operated from Hertfordsbire and usually works portable. Please let bim know (QTHR) if you hear the callsign again in that area.

A SNAG:

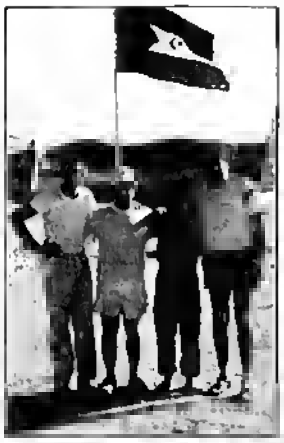
Howard, GOHZH is having prohlems with tbe coax feeder and rotator cable wbich runs up to the antenna on top of his Versatower P60. It seems that the cables are snagging when he raises and lowers the tower witb tbe result that it's costing him a fortune to replace them. He's tried several ways of routing the cables but to no avail. Can anyone suggest a foulproof (sic) metbod of getting the watts up to the antenna without the risk of more damage to tbe feeder and rotator cable? If so, please get in touch with Howard at:-

The Walk
Lower Ufford
Woodbridge
Suffolk IP13 6DL

HOME FOR OLD MAGS - 2:

The Northern Ireland section of the RAIBC is looking for any old books or magazines on radio which will be sold at various rallies to raise funds for RAIBC. If you've got some books or mags which are littering the floor of your shack and you'd like to dispose of them, please send them off to:-

David Caldwell, GIOHOW
59 Connsbrook Avenue
Belfast BT4 1JW



Lynx team Winds up Western Sahara operation

Report by Martti Laine, OH2BH

The recent SORASD HF operation was a roaring success, with many UK stations working the expedition on all bands. We were delighted to receive a letter from Martti Laine, OH2BH, telling us how they got on - it was so interesting we thought we'd reproduce it here;

"Following seven busy days of operating and training, the Lynx DX Group expedition to Western Sahara came to an end with the gear left in the country for use by local Sabaran amateurs, one of whom, Naama, was already beard practicing on the bands under the expert guidance of EA2JG, OH2BH and EA2ANC. The station closed down at 1500 UTC on Sunday 25 October 1987.

"This expedition netted a total of 11,864 contacts, including 1,264 long-path JAs, racked up in difficult desert conditions and using a TS430S with a TH3 beam and dipoles. Europeans accounted for 4,764 contacts with the US boasting 4,554. Out of the total number of contacts, 7,099 were on phone and 4,765 on CW. The principal targets were achieved in the sense that SORASD was put on the air for the first time and everyone was given a fair chance to make at least one contact with a new country. Running barefoot made it something of an uphill battle to control the ear-splitting SSB pile-ups, whereas things seemed more orderly on CW.

"Initial concentration on 20m and 15m was followed by spells of intensive activity on other bands, including 160m where 56 contacts were logged towards the end of the operation (ten of them with the Stateside gang). Due to a limited supply of electricity in the area, forcing the operators to run on a Jeep battery at night whilst the generator was reserved for daytime use, and the various training and social commitments awaiting the team members, no round-the-clock operation was possible.

"The Lynx group was overwhelmed by the great hospitality and friendship extended by the hosts and the local population, with most of the village people turning up for a Sahara Fiesta organised in honor of the visitors. The hosts proudly presented their achievements, eg. agricultural projects and irrigation systems, undaunted by a fierce sand storm which suddenly errupted on the Saturday. OH2BH reported that everyone was in good shape and fine spirits. Swimming in a desert well was a unique experience but, having survived on water for one week, Martti was dying for a glass of cold Coca Cola.

"In an amateur sense, another major achievement was the establishment of 'Club de Radioaficionados Saharauis', SORASD, now operating under the auspices of Naama Zeine-Eddine who, at the age of 33, is the local director of telecommunications. With his flair for DX-style ham operating, Naama surprised everyone with his natural talent for using the radio under those circumstances. He is fluent in Arabic, French and Spanish and knows enough English to handle QSOs. He should be on the air by now using his own callsign, SO1A or using the club callsign SORASD.

"The Kenwood Corporation has donated several complete sets of equipment to the Sabarans and, coupled with Naama's enthusiasm, this will make sure that the Arab Democratic Sahara Republic (R.A.S.D.) continues to be available to needy DXers throughout the world."

Tnx OH2BH - well done!

EA2JG and OH2BH checking the juice on the Jeep battery which was used when the generator was not available.

Footnote:

W4FRU, the Chairman of the DX Advisory Committee, reported in early November that the committee was voting whether to recommend country status for Aruba and will have voted in mid-December whether to recommend that the Arab Democratic Sabara Republic, RASD, be accepted for country status.

What does "use" mean ?

This month we take a look at the word "use" in the context of the 1949 Wireless Telegraphy Act

We receive the occasional letter from a member who asks a question of the following form; "I am a Class B licensee and I use an HF rig plus a transverter to operate on 144 MHz. Is the RIS going to come round and jump on me from a great height simply because I happen to have in my possession equipment which I could use in contravention of my licence schedule?"

Well, according to a recent case in the House of Lords the answer is no. This was Rudd v Secretary of State for Trade & Industry, in which the defendant, one Jeffrey Michael Rudd, ran a pirate broadcast radio station and was caught in the act. The interesting thing about this case was that a forfeiture order was made in respect of 19 items; most of these were the bits and bobs you might have expected, such as the transmitter, power supply and SWR meter but the others were a collection of records and cassettes. Rudd appealed against this part of the conviction, arguing that records and tapes did not constitute "apparatus for wireless telegraphy" within the meaning of section 14(3) of the Wireless Telegraphy Act 1949. The Crown Court dismissed the appeal but stated the following question for the opinion of the High Court;

> "....whether....the Crown Court were correct in holding that the word 'apparatus' in the Wireless Telegraphy Act 1949 included those items set out at sub-paragraph....(i.e.including the records and tapes) and that they therefore had the power to order forfeiture thereof...."

On 14 April 1986, a Divisional Court allowed Rudd's appeal on the basis that records and cassettes did not constitute apparatus within the meaning of section 14(3). The Secretary of State for Trade and Industry appealed to the House of Lords against this decision.

So far you might be wondering what all this has to do with amateur radio. Well, the House of Lords considered the matter and an important point emerged. The DTI submitted that, amongst other things, the court had made an error in holding that records and cassettes were not wireless telegraphy apparatus within the meaning of the wording of the Act; they cited the case of D (a minor) v Yates, which was reported in Radio Communication in 1984. The Lords said that this raised two questions, of which the second was;

> "....whether cassettes or records not actually in use but available for use at the station at the relevant time constituted apparatus in connection with which the offence was committed, such offence being that the respondent did, contrary to section 1(1), use apparatus for wireless telegraphy without the requisite licence".

In his judgment Lord Goff of Chieveley considered this point, and we can do no better than quote his words as given in the Weekly Law Report;

> "....In that case the appellant had been convicted of an offence contrary to section 1(1) of the Act of 1949, in that she used apparatus for wireless telegraphy, namely a Superstar 360 FM CB transceiver, without having the necessary licence. It was not in dispute that she owned a set of the type in question, and kept it at her home, and that no licence could be obtained for it. The only question was whether she had 'used' the set during that period; it was proved only that during the period she kept the set available for operation. The Divisional Court held that the offence had been established by the fact that the set was on the premises available for immediate use at any time"

Lord Goff of Chieveley then cited an earlier case involving the Road Traffic Act. He continued;

> (In reference to section 1(1) of the Wireless Telegraphy Act 1949) "....I can see no good reason why the word 'use' in that subsection should not be given other than its natural and ordinary meaning. D (a minor) v Yates was noted in 1984 Crim L R 430 and beneath the report appears a brief comment by J C S in the following terms;
>
> 'If the Parliament intended to make it an offence to be in possession of the apparatus with intent to use it, Parliament might have been expected to say so. In a section creating an offence, "use" should probably be taken to mean "use" in the absence of some compelling indication to the contrary'"

Lord Goff of Chieveley said that he agreed with this. He stated;

> "I can see no reason for concluding that the word 'use' as employed in relation to the offence created by section 1(1) of the Act of 1949 should be understood in any different sense.....I recognise that this conclusion may create problems for the enforcing authorities in so far as it means that they cannot simply rely upon the fact that the relevant apparatus was available for use. They will, I fear, have to go further and will if necessary have to persuade the court to draw the inference that the apparatus in question was used by the defendant during the relevant period.....For the reasons given I would overrule D (a minor) v Yates...."

The other Lordships in the appeal agreed with him , and the Secretary of State for Trade & Industry's appeal was dismissed.

So there it is - sorry to have to take you all round the Wrekin to get to the point but, basically, just because you happen to have an HF transceiver in the shack and a Class B callsign doesn't mean that the Radio Investigation Service can charge you with an offence under the WT Act!

The President's AGM Address

5 December, 1987

A grand total of 193 members attended the Society's Annual Heeting on 5 December. We'll bave the full minutes of tbe meeting in a month or two, but we thought you migbt be interested to know what the President, Joan Heathershaw, G4CHH, had to say in her formal address.

Mrs Heathershaw said that amateur radio had reached a critical stage in its history, not only in Britain but throughout much of the world. She said tbat the next few years would have a great influence in the future, and could make the difference between amateur radio heing only a "....passing fad in the history of this planet" or becoming an important part of modern-day life in a world which was becoming more and more dependent on higb technology.

Hrs Heathersbaw went on to say that the rate of increase in the number of amateur radio licences had heen slowing down for some time and that it appeared that saturation point had heen reached. There had heen a net increase of only 60 licenced radio amateurs in the UK hetween July 1986 and July 1987, and Hrs Heathershaw added that if the number of amateurs began to decrease, "....tben most certainly tbe writing is on the wall for the future". The national society could not argue in favour of new frequency allocations, and the position migbt be reached in which bands used for decades might be allocated away from the amateur service. She said that no-one was pretending that allocations would be removed overnight, but it was common knowledge that there was enormous pressure on the radio freguency spectrum and - if the number of licensed amateurs decreased - losses were inevitable sooner or later. The message for the future was a simple one. Either the situation must be addressed in a positive way or tbe conseguences of inaction would have to be faced.

Mrs Heatbersbaw stated that many of those within the Society had a clear vision of amateur radio in the future, and saw tbat one of its greatest assets was the ability to offer the layman a way towards tbe understanding of science, engineering and electronics. It was necessary to encourage more people to take up tbe bobby, and in order to achieve this it was

MRS JOAN HEATHERSHAW, G4CHH
President of RSGB 1987

important to be clear about what amateur radio could offer. It was clear that it offered technical challenges, international friendships, fun and pleasure to individuals; it was also clear that it had a place in society, particularly in terms of helping people to learn and understand the modern world. If the Society's vision was to succeed, it must he built on solid foundations and in a clear and rational way. Hrs Heathersbaw said that she was pleased to be able to tell tbe meeting that much of the work undertaken by the Society in the course of tbe previous 18 months had heen directed towards laying such foundations and planning to safeguard the future hy ensuring that amateur radio continued to flourish.

Hrs Heathersbaw then outlined some of the Society's activities in tbis area. The need to make a greater impact on hoth government and the general public had heen recognised, and it was considered vital tbat government saw amateur radio as heing bighly heneficial to society at large. It was encouraging that Mr John Butcher, the Under Secretary of State for the DTI, had accepted tbe Society's invitation to open its National Convention earlier in tbe year, and the Cbief Executive was shortly to follow up this success by baving a meeting with Mr Butcber in the near future.

The DTl was solidly behind the Society's wish to encourage young people into amateur radio, and had clearly indicated this hy offering a prize for Young Amateur of the Year during 1988. The Department's positive attitude had heen demonstrated hy the new 50 MHz allocation, which was now available to all UK amateurs, and also hy the substantial amount of work undertaken in conjunction with tbe Society to produce a new amateur radio licence. This would not only "....pick up all the loose ends of the past few decades" but would also make provision for future reguirements. lt was essential that licensing within the UK allowed new technology within amateur radio to flourish, and at the same time made it posible for beginners to acbieve efficient communications witb simple equipment.

Mrs Heathersbaw said that major changes in the Headquarters staffing structure had heen made. A Headquarters Hanager had been appointed to handle the routine day-to-day work, allowing the Secretary to become more involved in work dedicated to the future of amateur radio. Other changes had included the move of the offices of Radio Communication to Headquarters so that better utilisation of staff concerned with publications could be achieved. A new accountant bad heen recruited and up-to-date software which would enable the Society to have much hetter control of its finances had heen installed. These facilities bad obviously cost money in the short term, but they were certain to be a sound investment for the future. Also on the financial side, the Society had now finished paying for its computer installation, which meant that substantial sums of money would he saved as from the current financial year. Tbis would help balance the hooks and fund more benefits for members. New printers for the Society's magazine had been appointed and, althougb there bad been short-term production problems, there would be further savings in costs and management time.

Hrs Heathershaw added that the changes whicb had taken place within Headquarters were working well and there was room for still more improvement and fine tuning. Tbe Society would continue to strive for economies but it would

also continue to provide the best service to amateur radio which its resources would allow. Ways would be sought to maximise the effectiveness of both staff and volunteers; each group had its own talents and skills, and the Society intended to attempt to get the best out of each.

The volunteer effort in the field had been the subject of a reorganisation during the year, and considerable discussions between committees, working groups and Council had led to the adoption of a new system for the provision of more local help to members. The new liaison scheme had got off to a good start, and the Society was certain that - given the right will and determination - better service and help to members would be provided as a result. Serious thought had also been given to the committee structure and how best to use the available volunteer effort. A number of working groups to tackle specific tasks had been set up during the year; these had greater flexibility than normal committees and allowed the Society to seek help from experts in various fields who could not otherwise make a full commitment to the Society. An amateur radio direction finding group and a recruitment video group were two examples.

Mrs Heathershaw said that the 75th anniversary year would be an important milestone in the Society's history. It would offer an ideal opportunity to promote amateur radio to the public at large, to show off the best in contemporary amateur radio and to present an interesting and worthwhile hobby which had relevance to the UK electronics industry. Mrs Heathershaw added that it was notable that the country with the world's most thriving electronics industry, Japan, also had the highest number of licensed radio amateurs in the world.

The Society would look back with nostalgia at amateur radio and its achievements during the past 75 years. Everything which the founders of the RSGB stood for in 1913 was as relevant today as it had been then; the Society had been formed to provide a clear and unequivocal voice for radio amateurs, towards the improvement of the status and facilities accorded to them. Mrs Heathershaw said that amateur radio was not an activity which could naturally "....provide a large amount of political clout" and that the number of radio amateurs as a proportion of the total UK population was really quite small. However, amateurs could achieve far more by working through the Society than by individual effort. The Society would also continue to work with the International Amateur Radio Union to develop a positive programme for the future of amateur radio. Recalling the 1979 World Administrative Radio Conference, Mrs Heathershaw said that there would be a similar challenge in 1992, since it was likely that another WARC would take place in Geneva in that year; many amateur band allocations would be considered by the world's nations. She added that there was no point in having a strong amateur radio service in one large country if in many others it was failing to present itself effectively, since at Geneva each country had one vote.

Mrs Heathershaw said that the Society would continue where necessary to respond in depth to threats to amateur radio activities. She cited the CSP International report, with its implied curbing of amateur activities, and said that pet likes and dislikes must take second place to achieving the main objectives of amateur radio at this critical time in its existence. She hoped that each and every member of the Society would think clearly about the future and what it meant to them, and added that the Society naturally hoped that members would encourage the 45% of UK licensees who were not members to join its ranks. With such support, it would be possible to preserve and expand everything which was good about the hobby.

In closing her speech, Mrs Heathershaw said that as she neared the end of an extremely busy but extremely rewarding year of office, she would be less than honest if she did not admit there had been times when her spirit had flagged - although not for long. The enthusiasm and support of fellow amateurs and headquarters staff had spurred her on, and she thanked them for their efforts. She looked forward with renewed vigour to joining in support for the Society's 1988 President, Sir Richard Davies, and to working with him to see the Society's plans reach fruition.

LOOK OUT FOR THE MINUTES OF THE AGM & EGM HOPEFULLY IN THE MARCH ISSUE

DISCONES - TO Tx OR NOT TO Tx?

Your humble scribe found out the other day how to blow up the PA of a 430 MHz transverter through not thinking before transmitting - so we pass on the horror story in case anyone else has the same bright idea....

There's a commercial 50-500 MHz "discone" antenna on the chimney of the editorial hovel; this feeds a little scanning Rx used for sporadic E monitoring, listening to distant repeaters to check on conditions and general shack-type purposes. The discone, as everyone probably knows, is a broadband omnidirectional antenna which is just the job for this application. Now it so happened that last week an old chum of the editors' was in his neck of the woods on business and decided that a nice cup of tea and some bikkies would break the journey nicely; a telephone call was made and some talk-in arranged. Snag was, however, that said talk-in had to be on UHF since matey didn't have his 144 MHz Batfone with him -and although Scribe had his homebrew 430 MHz transverter there currently were no 430 MHz antennas up.

At this point Scribe had his brainwave. Why not hook the 430 MHz rig up to the discone and use that? Just the job for mobile talk-in - vertical polarisation, omnidirectional, much better than beams. "No problem", he said to his mate, "call me five miles out on SU15 and we'll take it from there". Up he went to the shack, connected the 430 MHz transverter to the discone and awaited events. Sure enough, up comes the mobile on schedule and Scribe presses the button to do his bit. Alas for Scribe and mobile mate, they couldn't establish contact - the base-station transverter didn't appear to be producing any RF output, although it was hearing the mobile perfectly well. Later that day it was established that the transverter wasn't producing any power into a dummy load either, basically because the PA transistor in it had failed. Since it had been in use for about six years and was considerably under-run this seemed a bit strange, but a chance remark during a 144 MHz contact led to suspicion falling on the discone. Could it have looked like a weird load and taken out the PA?

A professional colleague with access to all sorts of clever test gear offered to make some measurements on his own, similar discone antenna and the results were interesting. They suggested

(cont on page 48)

RSGB SLOW MORSE BROADCASTS:

* Frequencies on 2m

* Slow Morse Coordinator Wanted

As almost every active amateur knows, activity in the 144 MHz to 146 MHz band is very high; what with CW and SSB DX-chasing at the bottom end, a large-scale repeater network at the top end and heavily-used simplex FM channels in the middle - not to mention various spot frequencies set aside for all sorts of bits and bobs - it's hard sometimes to find a clear space to do your thing, unless perhaps you're one of the lucky ones who dwell in the Outer Hebrides or wherever. And that's just when the band is in average shape; when conditions are good 144 MHz can make the HF bands sound like a nice quiet place to take refuge.....

One of the activities which takes place in the 144 MHz band is the slow Morse broadcast service, which is handled by a band of dedicated volunteers for the benefit of those preparing for the Morse test. A group of these in the London area recently experienced some interference from packet radio transmissions - indeed, they became so concerned about the problems which were arrising that they brought the topic up at the Society's AGM held last December. So we thought we'd take a quick look at some of the relevent points, and also ask for a volunteer (you, you and you) to fill a new appointment connected with the slow Morse broadcast service.

Bandplans affecting radio amateurs in Europe are agreed on an international basis at Region 1 IARU Conferences. Bandplans for any band, not just 144 MHz, are nothing more than an attempt to make best use of the limited spectrum which is available so that as many different interests can be catered for without all sorts of chaos and mayhem arising. They're a mixture of tradition and some basic principles, and they're the result of a good deal of discussion and give-and-take; at the end of the day the result is a workable compromise. They are voluntary - in the sense that they're not part of the licence and if you transgress them the RIS won't descend on you with pointed sticks, etc - and they only work because in general terms amateurs are thoughtful, self-disciplined and generous. It's good will which makes bandplans work, not threats, and it's good to know that in general terms they work remarkably well.

Krishna B Khatry, 9N1MC, Chief Engineer at the Ministry of Communications in Nepal, met the Prime Minister of India, Mr Rajiv Gandhi, VU2RG, just prior to a meeting between the Prime Minister and His Majesty Jigme Singye Wangchuk, King of Bhutan which took place in Nepal on 3 November during the South Asian Association for Regional Cooperation summit conference. Krishna was able to discuss a number of amateur radio matters with Mr Gandhi. The photograph (taken by Krishna) shows His Majesty Jigme Singye Wangchuk (left) and Prime Minister Rajiv Gandhi (right) during their meeting.

Coming back to basic principles, each country can, of course, asign specific usage to various frequencies so long as the modes of operation fall within the terms of the internationally agreed IARU bandplan. As far as the 144 MHz to 146 MHz band is concerned, the job of planning frequency usage is the responsibility of the RSGB VHF Committee. When the London slow Morse problem arose, it was naturally refered to this committee for them to deal with - and at a recent meeting it was agreed that slow Morse broadcasts which are co-ordinated by the RSGB should take place on either 144.250 MHz (for CW/SSB transmissions) or 145.250 MHz (for the tone-modulated FM/PM transmissions). Members are asked to note that these two frequencies will be used to help people learn Morse, and as such it would be nice if they could be avoided if at all possible. If notbing else, please check carefully that neither is being used for a broadcast before you use them. We'd be grateful if the message could be passed on to clubs and groups as well, so that any non-members of the Society could be put in the picture.

Council has also agreed that a co-ordinator for the slow Morse broadcast service should be sought; one of his.her responsibilities would be to make sure that all slow Morse broadcasts authorised by the Society are co-ordinated in such a way that there is no interference to broadcasts in adjacent areas. Anyone interested is asked to write to the chairman of the Membership Liaison Committee, c/o RSGB Headquarters, and any views on the subject will be appreciated.

So - don't forget that 144.250 MHz and 145.250 MHz are frequencies which will be used for the benefit of those wanting to learn Morse. Please give them a Big Miss if you possibly can.

75th ANNIVERSARY SOUVENIRS:

The new 75th anniversary logo, which appears on the front of this month's RadCom for the first time, will be used on a number of souvenir items which we'll be making available to members.

The kind of things we have in mind are ties, badges, stickers for your QSL cards, car stickers and a specially minted commemorative medal. However, we've still to fix the final costs and quantities but one thing is for sure most of the items will be in limited editions.

We'll be giving details of how to order your 75th anniversary souvenirs in a month or so - watch this space - and when we do you'll have to be quick off the mark.

Events Diary

CLUB NEWS:

Starting with the March issue, the "Events Diary" will be expanded to include Club News. However, in an attempt to reduce the number of pages presently used for Club News, we will be using a more abbreviated format, listing clubs alphabetically under counties and giving the date and subject of the meeting. As in G8ZRS, netter nights and committee meetings will not be listed. The full details of when and where clubs meet, the contact person and telephone number will be published twice yearly in the UK Callbook and twice yearly (90° out of phase) in the Bulletin. The typical entry will look something like this:-

AVON:

Avon ARS - 9th lecture "Propagation"; 16th OF hunt; 23rd lecture "TVI"; 30th demonstration "Satellite TV".
E.Bristol ARS - 4th lecture "Contests"; 18th video "Aerial Circus".

Items for inclusion in the March issue must be sent to HQ marked "Club News - Bulletin", and be received by Monday 25 January latest.

Mobile Rallies

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Bulletin'.

24 JANUARY
*Oldham Amateur Radio Rally - Queen Elizabeth Hall, Civic Centre, Oldham. All the usual attractions including a bring & buy stall. Doors open 11am, talk-in available on S22 from 9am. Free equipment minding service. Details Cathy, G4ZEP tel: 061-652 8617.
31 JANUARY
*26th NARSA Exhibition - Norbreck Castle Exhibition Centre, Blackpool. New venue, usual traders, *RSGB stand*. Details Peter G6CGF, tel: 051-630 5790.
27 FEBRUARY
*Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. (5 mins from M2 junc 4). Opens 10am, many traders, bring & buy stall. Talk-in on S22, SU22 and 29.500 MHz FM by GB4RRR. Details Bob G1LKE, tel: Medway 362154.
28 FEBRUARY
*1st Taw and Torridge Rally - BAAC, The Pill, Bideford, North Devon. Opens at 10.30am, trade stalls, bring & buy stall, refreshments and bar. Ample parking and talk-in on S22. Details G0AYM, tel: 02375-488.
5 MARCH
*Blue Star Rally - High Cosforth Park (Newcastle Racecourse). Usual traders, refreshments. Details Terry G6VEG, tel: Tynaside 2866908.
6 MARCH
*Welsh Mobile Rally - The Barry Leisure Centre, off Holton Road, Barry. Details Mike GW8CMU, tel: 0446-711426.
13 MARCH
*South Essex ARS Mobile Rally - The Paddocks Community Centre, Canvey Is, Essex. Rally opens 10am. Talk-in on S22. Details G0BBN, tel: 0268-755350.
*3rd Annual Wythall RC Rally - Wythall Park, Silver Street, Wythall (south of Birmingham on A435, 2 miles from M42 junc.3). Opens 12 noon, 3 large halls, usual traders, junk and flea market, bar & snacks. Talk-in on S22. Details Chris G0EYO, tel: 021-430 7267.
*Bury HamFeast - New venue, The Castle Sports Centre, Bolton Street, Bury, one mile from M66. 12,500 sq ft, all on ground floor, usual traders, bar and catering facilities. Details G4JAG, QTHR.
20 MARCH
*8th Annual Pontefract Components Fair - Carleton Community Centre, Pontefract. Opens 11am, trade stands, bookstall, prize draw, car-boot sale, bar and refreshments. Talk-in on S22. Details Colin G0AAO, tel: 0977-431D1.
*Mid-Devon Rally - Pannier Market, Tiverton (8 mins from M5 junc.27). Opens 10am, 2 halls of trade stands, bring & buy stall, displays, snack bar and full refreshment facilities. Talk-in on S22, well signposted. Details G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon.
*Cambridgeshire Repeater Group Junk Sale Rally Extravaganza - Philips RCS (Pye Telecom) Canteen, St.Andrews Road, Chesterton, Cambridge. Opens at 10.30am (auction items accepted from 10am). Junk sale auction, bring & buy stall, trade stands, refreshments. Talk-in on S22 and via G83PY by GSPL. Details G8XMS, tel: 0220 23-3362.
27 MARCH
*White Rose Rally - The Refectory, University of Leeds. Details G0EGM, tel: 0532-676368.

IN BRIEF - More details later.

10 APRIL
*North Cornwall Radio Rally - Launceston Town Hall. Details Maggie, RS90696 tel: Launceston 5632.
*Lough Erne ARC Rally - Killihavlin Hotel, Enniskillen. Details Billy, tel: 0365-24905.
17 APRIL
*Trafford Rally & Components Fair - Lancashire County Cricket Ground (Old Trafford), Talbot Road, Old Trafford, Manchester. Details Graham G1IJK, tel: 061-748 9804.
24 APRIL
*BATC Rally - Rugby Post House Hotel, Crick, Northants, (M1 junc 18). Details Trevor G8CJS, tel: 0532-670115.
*Swansea ARS Rally - CHANGE OF VENUE, Swansea Leisure Centre. Details Roger GW4NSH, tel: 0792-404422 evenings.
*Marske-by-the-Sea Rally - Marske Community Centre, High Street, Marske, nr Saltburn, E.Cleveland. Details Jimmy G1VLG, tel: 0642-219586.
1 MAY
*RSGB VHF CONVENTION - Sandown Park Racecourse, Esher, Surrey. Details G3FZL. Trade - Les, G5MD tel: 040 928-342.
*5th Anglo-Scottish Rally - Tait Hall, Kelso. Details Andre GM3VLB, tel: 0573-24664 (evenings).
2 MAY
*Mid Cheshire ARS Rally - Civic Hall, Winsford, Cheshire. Details tel: 0606-553401.
*Doncaster Radio Rally - Bircotes Sports Centre, nr Bawtry, Doncaster. Details Audrey Wilson, tel: 0302-721259.
8 MAY
*Swindon & DARC Radio, Electronics & Model Engineering Fair - Science Museum, Wroughton, nr Swindon, Wilts. Details Ken G8SFN, tel: 066689-307.
*Drayton Manor Rally - Dreyton Manor Park, nr Tamworth, Staffs. Details Norman, tel: 021-422 9787.
*Yeovil QRP Convention - Preston Centre, Monks Dale, Yeovil. Details Dave G1MNM, tel: Yeovil 79804.
*Drayton Manor Rally - Dreyton Manor Park, nr Tamworth, Staffs. Details Norman, tel: 021-422 9707.
15 MAY
*31st Northern Mobile Rally - Great Yorkshire Showground, Harrogate. Details Harry G3COO, tel: 0943-602118.
*Cambridge & DARC Rally & Car-boot Sale - Coleridge Community College, Radegund Road, Cambridge. Details Brian G4TRO, tel: 0223-353664.
29 MAY
*12th East Suffolk Wireless Revival - Civil Service Sportsground, Buckleshem, nr Ipswich. Details Jack G4IFF, tel: 0473-464047.
*Plymouth RC Mobile Rally - Plymstock School, Plymstock, Plymouth. Details Joe G1RXR, tel: 0752-662511.
5 JUNE
*Southend Mobile Rally - Rochway Centre, Rochford, Essex. Details G8EFC, tel: 0268-755331.
*Bolton ARC Mobile Rally - Venue to be announced. Details Kenneth G6ZJL, tel: 0204-696906.
12 JUNE
*Elvaston Castle Mobile Radio Rally - Elvaston Castle Country Park, nr Derby. Details John G4PZY, tel: 0332-767994. Trade enquiries, G4HIJ, tel: 0335-43241.
*RNARS Annual Mobile Rally - HMS Mercury, nr Petersfield, Hants. Details G4UJR tel: 0703-557469.
18 JUNE
RAFARS Golden Jubilee Radio Rally - RAF Halton Air Show, Wendover, nr Aylesbury, Bucks. Details Terry G4PSH, tel: 0296-85760.
26 JUNE
*31st Longleat Mobile Rally - Longleat House, Warminster, Wilts. Brian G4FRC, tel: Portishead 848140.
10 JULY
*Worcester & DARC Strawberry Rally - Droitwich High School. Details Steve, tel: 0905-424151.
*Sussex Mobile Rally - Brighton Racecourse. Details Bob G1IDS, tel: 0798-43841.
24 JULY
*MoMichael 88 Rally - Maymill Centre, Burnham, nr Slough. Details Bob G0BIY.
*Anglian Mobile Rally - High Woods Sports & Leisure Centre, Severalls Lane, Colchester. Details G6HOI, tel: 0206-862403.

RSGB 75 CELEBRATIONS

15/16/17 JULY
RSGB 75 - NATIONAL CONVENTION: National Exhibition Centre, Birmingham. Details RSGB HQ. Trade - Norman, G3MVV tel: 0277-225563

18 JULY
RSGB HEADQUARTERS CLOSED FOR ONE DAY

19/20/21 JULY
RSGB 75 - HQ OPEN DAYS: Visitors welcome from 10am to 4pm each day. Details RSGB HQ

22/23 JULY
RSGB 75 - DATA SYMPOSIUM: Harrow School, Harrow-on-the-Hill. 2-day symposium covering all aspects of data communication.

24 JULY
RSGB 75 - FAMILIES' DAY: (More details later)

28 JULY
RSGB 75 - INTERNATIONAL SATELLITE SEMINAR: University of Surrey, Guildford. Details RSGB HQ.

29/30/31 JULY
RSGB 75 - AMSAT UK COLLOQUIUM: University of Surrey, Guildford. First day special technical meeting by invitation only. Last two days full lecture programme and social events for all delegates. Details Ron G3AAJ tel: 01-989 6741 (social hours please)

31 JULY
*Scarborough ARS Rally - The Spa, Scarborough. Details Ian G4UOP, tel: 0723-376847.
7 AUGUST
*RSGB MOBILE RALLY - Woburn Abbey, Bedfordshire. Details RSGB HQ. Trade - Norman, G3MVV tel: 0277-225563.
*Flight Refuelling Hamfest '88 & Craft Fair - Horley, near Wimborne, Dorset. Details John GOAPI, tel: 0202-691649.
14 AUGUST
*Derby Rally - Lower Bemrose School, Derby. Details Jack G3KQF, tel: 0332-772361.
21 AUGUST
*Red Rose Rally - Bolton Sports & Leisure centre, Silverwell Street, Bolton. Details David G1100, tel: 0204-24104, evenings.
28 AUGUST
*Torbay ARS Rally - STC Social Club, Brixham Road, Paignton, Devon. Details G3KZJ.
4 SEPTEMBER
*21st Preston ARS Rally - University of Lancaster. Details Godfrey G3DWO.
*Telford Radio Rally & Exhibition - Details Martyn G3UKV tel: 0952-55416.
*5th National Amateur Radio Car Boot Sale - The Shuttleworth Collection, Old Warden Aerodrome, nr Biggleswade, Beds. Details Tony GOCOQ.
11 SEPTEMBER
*Lincoln Hamfest '88 - Lincolnshire Showground, 4 miles N of Lincoln on A15. Details John G8VGF, tel: 0522-25760.
*Venge ARS Rally - Nicholes School, Leinster Road, Basildon. Details Alan G4DJN, tel: 0277-624386.
17 SEPTEMBER
*Scottish Amateur Radio Convention - Aberdeen. Details GM4ZUK.
18 SEPTEMBER
*Bristol Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Details Dave G4WUB, tel: 0272-839855.
*Peterborough E&RS Rally - Wirrina Sports Stadium, Bishops Road, Peterborough. Details Fred G4NOG, tel: 0733-77032.
25 SEPTEMBER
*RSGB HF CONVENTION - Bellry Hotel, nr Oxford. Details RSGB.
2 OCTOBER
*Great Lumley AR & ES Rally - Community Centre, Great Lumley, Chester-le-Street, Co.Durham.
*Wakefield Mobile Rally - Details Steve G4RCH, QTHR.
8 OCTOBER (Provisional)
*Midlands VHF Convention - Details Peter G3UBX.
9 OCTOBER
*Armagh Rally - Drumshill House Hotel, Armagh. Details G1BRNX.
28/29 OCTOBER
*Leicester Amateur Radio Show - Granby Halls, Leicester. Details Frank tel: 0533-553293 daytime.
13 NOVEMBER
*Bishop Auckland Radio Rally - Venue to be advised. Details Morris, tel: 0525-314638.

Events Diary

OTHER EVENTS

10 JANUARY
*Sunderland ARS Annual Surplus Equipment Auction - Porcupine Park, Queen Alexandra Road, Sunderland. Items may be booked in from 11.30am, viewing from 12 noon, auction starts 12.45pm. Bar facilities. Talk-in on S22. Details Nigel GOASH, tel: 091-528 8079.

GB Calls

The list below shows ALL the special event stations licensed for operation during January and February (as at press date)

It is taken direct from the GB Calls file on the HQ computer. These callsigns are valid for use from the date given but the period of operation may vary from 1 to 28 days. There's now no need to send details direct to the editorial office.

Because of the problems we have had recently in the production of Radio Communication, we've included all of the special event stations (as at press date) for February as well as for January as a safeguard in case of further problems. This also means that we have been able to include many of the "Guides Thinking Day" stations as a preview to next month's issue.

NOTE: This list is taken from the Headquarters' database during the first week of the month prior to publication. If you have an event which is taking place during the latter part of the month of issue, you must send your form in to Headquarters at least 10 weeks in advance to ensure that it can be processed ready for the listing, otherwise it will miss the copy date.

7 JANUARY:
GB0COE - COASTAL DEFENCE "E": Fort Purbrook, Locator IO 90 LU. Details GODHZ.
GO1DSS - BEESTON SEA SCOUTS: Toton, Notts. Details G1WDZ.
GB4ORC - OLDHAM RADIO CLUB: Moorside Conservative Club, Rippondon Road, Moorside, Oldham. Details G4ZEP.
GB8DP - DENBY DALE PIE - Shelley, Huddersfield. Details G3SDY.

4 JANUARY:
GB0CDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.
7 JANUARY:
GB21ST - 21ST (ANNIVERSARY BARRY COLTEGE OF FURTHER EDUCATION): The Annexe, Weycock Cross, Barry. Details GW0ANA.
8 JANUARY:
GB4CG - CHALFONT ST GILES: The Garden Centre, Chalfont St.Giles, Bucks. Details G4MDN.
GB4CL - CHORLEY TIDNS: Tostock Hall, nr Preston. Details GOENW.
GB4WHT - WYTHENSHAWE HEART TRANSPLANT: North Cheshire Radio Club, Morley Green, Wilmslow. Details GODMZ.
9 JANUARY:
GB2ILA - INTERNATIONAL LISTENERS ASSOCIATION: I.L.A. HQ, 1 Jersey Street, Mafod, Swansea. Details GW4OXB.
GB6SC - SOURBRIDGE CLUB: Oldswinford Hospital School. Details G4XOM.
12 JANUARY:
GB8RRA - RED ROSE AWARD: Bolton, Lancs. Details GI1OO.
14 JANUARY:
GB2SSJ - SALOP SILVER JUBILEE: Ye Old Bucks Head, Frankwell, Shrewsbury. Details GOEJY.
15 JANUARY:
GB2PPC - PRIOR PARK COLLEGE: Bath. Details G3LYW.
16 JANUARY:
GB0COF - COASTAL DEFENCE "F": Fort Fareham, Locator: IO 90 JU. Details GODHZ.
GB0COS - COASTAL DEFENCE "S": Fort Southwick, Locator: IO 90 KU. Details GODHZ.
GB4TSA - TRAINING SHIP ANTELOPE: Wye-Side, Hereford.
17 JANUARY:
GB1COB - COASTAL DEFENCE "B": Fort Brockhurst, Gosport. Grid: SU 597 020. Details G1TOS.
18 JANUARY:
GB4TSA - TRAINING SHIP ANTELOPE: Southdale, Hereford.
23 JANUARY:
GB6RB - ROBERT BURNS: Land of Burns Centre, Nurdochs Lane, Alloway. Details GM4SUC.
25 JANUARY:
GB2NRS - NORTHERN RADIO SOCIETIES: Norbeck Castle Hotel, Queens Promenade, Blackpool. Details G4BFH.
1 FEBRUARY:
GB0CDE - COASTAL DEFENCE "E": Fort Purbrook, Locator: IO 90 LU. Details GODHZ.

GB0CHE - GLASCOTE HOBBIES EVENING: Glascote Comprehensive School, Silverlink Road, Glascote, Tamworth. Details GOEVJ.
GB4RC - RUABON GUIDES: Scout Hut, Johnstown, Wrexham. Details GW4WUR.
4 FEBRUARY:
GB0CDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.
8 FEBRUARY:
GB4GDS - GUIDES OF SHEFFIELD: Guide HQ, Trippet lane, Shellield. Details G4NRU.
13 FEBRUARY:
GB0RAC - RAC (WEEK): Bishop Grosseteste College, Newport, Lincoln. Details G4SID.
GB4GG - GIRL GUIDES: Brighton, E.Sussex. Details GOEXS.
14 FEBRUARY:
GB1COB - COASTAL DEFENCE "B": Fort Brockhurst, Gosport. Grid: SU 597 020. Details G1TOS.
GB2ASG - ASTLEY SCOUTS & GUIDES: Scout HQ, Ellesmere Street, Astley, Tyldesley, nr Manchester. Details G4GWF.
15 FEBRUARY:
GB2SK - 2ND SKELTINGTHORPE (BROWNIES): Sexliby, nr Lincoln. Details G3UPI.
16 FEBRUARY:
GB0COF - COASTAL DEFENCE "F": Fort Fareham, Locator: IO 90 JU. Details GODHZ.
GB0COS - COASTAL DEFENCE "S": Fort Southwick, Locator: IO 90 KU. Details GODHZ.
GB0NSG - HAMPDEN PARK SCOUTS & GUIDES: Eastbourne, E.Sussex. Details G4YJW.
19 FEBRUARY:
GB0FDG - FALKIRK DISTRICT GUIDES & SCOUTS: Falkirk Guide Hall, The Pleasance, Falkirk. Details GMDHJS.
GB0WGG - WIRRAL GIRL GUIDES: District Scout HQ, Royden Pk., Frankby. Details G4UDR.
20 FEBRUARY:
GB0BSR - BLUE STAR RALLY: High Gosforth Pk., (Newcastle Racecourse). Details G4ILW.
GD1CPG - COED POETH GUIDES: Minera, Wrexham. Details GW1THV.
GB6MGB - MATTBY GUIDES AND BROWNIES: Maltby, nr Rotherham. Details G6PMP.
24 FEBRUARY:
GD8MC - MAYFIELD CENTRE: Macclesfield, Cheshire. Details GOAHU.
27 FEBRUARY:
GB2SDD - SAINT DAVIDS DAY: British Steel Corp. Sports & Social Club, Port Talbot. Details GW4HOO.

(cont from page 45)

that at 430 MHz the thing didn't possess the 1:1 VSWR you might have expected with a broadband antenna - it was actually about 7:1 at 434 MHz. A swept frequency plot of VSWR showed all sorts of fascinating excursions, and in fact the lowest figure recorded for this particular commercial type was just under 3:1 at 283 MHz - not much use for the amateur service, although no doubt useful if you just can't stop yourself trying to talk to the Red Arrows or your local RAF air traffic control unit! Although it was supposed to be a 50 to 500 MHz antenna the SWR at both 50 and 500 MHz was about 15:1; at 70, 144 and 430 MHz the figures were 12, 6 and 7:1 respectively. Moral of the story? Discones make nice broadband antennas for scanning receivers, but don't assume that because they're allegedly broadband they'll necessarily display a nice 1 to 1 SWR and keep your Tx happy - best to check with the manufacturers if you're thinking of using one for transmitting. Thinks - how does the Royal Air Force persuade those nice-looking discones you see on top of their control towers, etc, to transmit quite happily between 225 and 400 MHz? Answers on a postcard....

NEW TNC:

Those interested in packet radio might like to note that there's a new TNC available from Siskin Electronics. "Fine, great, so what?" we hear you say - well, as far as we're aware, it's the first commercial TNC that'll cause less than £100 worth of QSB in the wallet. It's called the "Pac-Comm Tiny-2" and is a 1200-baud machine for VHF/UHF use - cost is £99.95. Pac-Comm is also bringing out its "Micropower-2" in the new year at £159.95.

Contact Siskin Electronics at PO Box 32, Hythe, Southampton SO4 6WQ or, alternatively, ring them on 0703 849962.

WHERE WERE YOU ON 30 JUNE 1987?

Specifically, were you operating on 144 MHz and did you have any sporadic-E contacts at any time on that day? Weatherman Jim Bacon, G3YLA, is undertaking an intensive study of sporadic-E with a view to finding out more about the mode - he's already come up with some very interesting things, which hopefully we'll get to publish at some stage, but he would very much like some data for that particular day. Please take a look at your logbook, and if you worked anything DX-ish via Es, let Jim know by letter. His address is:-

Highways
East Tuddenham
Dereham
Norfolk NR20 3AH

SSB ON 24 MHz:

We've had reports just lately of one or two stations operating in the 24 MHz band and using SSB. Not on, chaps - the licence schedule specifically states that thou shalt only use CW in the 24 MHz band (and in the 18 MHz band for that matter), so forget SSB operation or the RIS will hang you from the highest tree in the vicinity.....

NEWS AND VIEWS

HF

*John Allaway, G3FKM**

MAYBE IT IS NECESSARY to spell things out in greater detail sometimes! Since the November column appeared it has been pointed out that my remarks on where packet radio transmissions might to take place were not correct for frequencies above 30MHz. Perhaps I should say that my comments (and the AC Resolution) referred to the hf bands only and, in fact, the letters "hf" should have appeared between the words "maritime" and "packet" in the seventh line of the item.

Jean-Pierre Coulert, HE9JPC, is very interested in braille QSL cards and would like to contact others who collect such items. Jean may be reached c/o the International Amateur Radio Club, PO Box 6, CH-1211 Geneva 20, Switzerland.

Another New Year—one of great promise for hf dxers—and I would like to wish all readers all that they would wish for themselves throughout 1988.

Northern California DX Foundation

In a press release dated 10 November it was announced that the NCDXF Board of Directors has voted to provide US $1,000 plus assistance with QSLs for each of two upcoming expeditions. The first was to take place between 16 and 25 November and would be an expedition by Hans, DK9KK, and Baldur, DJ6SI, to Somalia, (T5). The second will be a two-week operation from Auckland & Campbell Is, (ZL9), in February 1988 by Ron, ZL1AMO, Roly, ZL1BDQ and Baz, ZL1BN.

The foundation's 14·1MHz S African beacon ZS1DN was temporarily off the air (at the time of writing) following a lightning strike. ICs were being replaced and it should be back to normal by the time this is read. NCDXF will make available detailed information on the construction of beacon station equipment to anyone wishing to construct additional beacons to fill or expand the network.

NCDXF also announces the retirement of long-time director Bud Stone, W6WB. Bud has served from the early days of the foundation and was responsible for the design of the logo, brochures and literature. He will continue to serve as director emeritus.

NCDXF has donated a Kenwood TS-440S to the Egypt Amateur Radio Society in the hope of stimulating additional activity from this rare location. This was the rig used by N6TJ in the just-completed CQWW SSB DX Contest for his operation from SU1ER.

Additional information concerning NCDXF is available from Rusty Epps, W6OAT, 651 Hamlley Trail, Redwood City, Cal, 94062,USA.

SMOM

G4NXG has kindly supplied some information about this "state" from a travel guide, and it may interest readers. It says: "Rome is the seat of the smallest sovereign state in the world which is not, as most people think, the Vatican but the Sovereign Military Order of Malta. It is situated on the Via Condotti and is accorded sovereign extra-territorial rights by the Italian State. The Order was founded in 1113 to protect pilgrims to the Holy Land. The Knights of St John of Jerusalem having in turn been driven from both the Holy Land and Rhodes, were granted the island of Malta. There they remained until both the occupation of Napoleon and then the British occupation of Malta left the knights without a home. They settled in the palace in Rome left to them by the archaeologist Antonin Bosio, where they remain today.

The Order issues passports, has its own diplomatic service and vehicle licensing system – number plates bearing the letters SMOM – and the Order still carries on the humanitarian work around the world for which it was founded."

DX news

During Telecom 87 several Iranian visitors came to the amateur service stand. One of these gave me the information that there are at present six properly-licensed EP callsign holders. These are Reja, EP2MRD; Dawood, EP2DL; Hassan, EP2HZ; Mohammed, EP2HRD; Saeed, EP2ASZ; and Ali, EP2AK. EP2HZ was to have been on the air quite legally during the weekend of the CQ WW DX Contest (phone) and seems to have been worked since.

Following the item on Lebanon which appeared a few months ago, G0DKN has written to say that he worked OD5VT and has received his QSL via QSL manager HB9CRV.

Martin, OY7ML, is still being plagued by QSLs for contacts which have been made by a pirate using his callsign. This has been going on for about a year but has been much worse recently. The pirate uses a Vibroplex keyer, but Martin has a squeeze keyer. Most phoney contacts are taking place on 14 and 21MHz, with occasional 7MHz appearances, and in nearly all cases the pirate calls "CQ DX" or "CQ USA" and doesn't answer Europeans.

F6AJA, editor of *Les Nouvelles DX*, has a list of stations for which he holds logs and a supply of QSLs. Some of these are as follows: FG0BKZ/FS7 (12·81 and 3/4·84); TR8JD and TR8YL (1982-1984); TR0AB (Jan/Feb 84); FY0HVL, FM0HVL, FG0HVL, FG0HVL/FS, FY0HVM, FM0HVM, FG0HVM and FG01VM/FS (June 83); FY0HVL (6·84); C31MD (CQWW Phone – 84); FP/F2JD (12·86); TK5BL/FS (1/2·86); 3C3CR (7·87); and TR8CR (7·87). His QTH appears in "QTH Corner".

SP6BZ reports that 5A0A made over 35,000 contacts on all bands 3·5 to 28MHz. Hubert does not expect to return to Libya. A station signing 5A5HS has been worked from the UK on 7MHz ew but it seems likely that this is a pirate. 7P8CB is now on the air from Lesotho and will be there for several years. He is active most days around 1700 on 21MHz ssb.

Jim Smith reports that a Heard Island DX Association visit to Baker and Howland Is (KH1) is being planned for March. Final landing permission was being awaited and if all goes well the expedition may consist of 10 members including two from the US Fish and Wildlife Service.

Ian, G4LJF, this year's winner of the Bermuda Contest

18 and 24MHz

Greatly increased activity on these bands is the result of the upswing in the sunspot cycle and of course is most welcome. However, a number of UK stations have been heard using ssb, particularly on 24MHz. Unlike 10MHz, where most of us have agreed to abide by the "gentlemen's agreement" not to use phone, the restrictions on 18 and 24MHz are not optional – the licence specifies 10W of ew only into a horizontally-polarised dipole, and anyone caught using phone could lose his or her licence. There are still primary users in these bands and QRM from amateurs could cause us to lose their use until the full transfer procedure is completed in several years time. Please don't do it!

Welcome. . .

... To the following who joined the Society during October: DA2RI, EA1OD, EA3KU, EI3CGB, EI5CYB, EI8GP, F6EXG, OA4AD, SV1AM, V85TV, W2DAP and ZS6ASK. New listener members are P Brett and G Jacques (F) and G Crane (DL).

The Ex-G Radio Club

A reminder at the beginning of the new year that this club exists to keep together those born in the UK but who are now living abroad. Club nets available to Europeans take place as follows: (Sunday) 1900 Worldwide Net on 14,347kHz, and the Canadian Net at 1630 on 14,155kHz. There is an informal "Family" Net daily at 1130 on 14,333kHz, and on Mondays and Fridays another branch of this one meets at 1130 on 14,346kHz. When 28MHz is open there is a Family Net on 28,850kHz at 1600. Club calling frequencies are 14,348, 21,230 and 28,850kHz.

*10 Knightlow Road, Birmingham B17 8QB.

Awards

Worked All VK1-0 Award
For confirmed contacts with H.I.DX.A members in each of the 10 Australian call areas (VK1–VK0). Requirements are one confirmed QSO with any station on Heard Is plus two confirmed QSOs with members in each of VK1 to VK8 inclusive. In addition, two confirmed QSOs with members in any two VK9 call areas (but not with VK9NS on 14,220kHz), and one with a member in VK0 (other than Heard Is). QSLs must be in the possession of the applicant but need not be submitted. The award costs US $2 and applicants should use the official application form (photocopies from G3FKM). H.I.DX. A membership lists are available from PO Box 90, Norfolk Is, Australia 2899, price US $2.

Pennonia Award
For two confirmed QSOs after 1 January 1966 with each of the call areas HA/HG 1,2,3 and 4 on more than one band. Apply to Radio Club HA1KSA, PO Box 79, Gyor, H-9001 Hungary.

Saveria Award
For QSOs on or after January 1976 with 20 different HA1/HG1 stations. Apply to Manager, Saveria Radio Club, Puskas T.u.7, Szombathely, H-9700 Hungary.

Budapest Award
European applicants need to have 75 different QSLs from HA/HG5 stations for QSOs on or after 1 January 1959. Apply to Verebes Janosne, HA5YR, PO Box 64, Budepest, H-1475 Hungary

Balaton Diplome
Europeans need 30 points. Contacts with members of the Radioclub Siolok count five (HA/HG 3s KGL, KHL, GI, GJ, GQ, HE, HL, HO, HZ, IG, IK, IO, tS, NG, HA/HGs, 4XW, 6NP, 8UA), stations located around Leke Balaton three points, and those in Zala, Veszprem and Somogy one. Apply to Josel Tuljenyl, HA3GJ, PO Box 78, Siolok, H-8601, Hungary.

Send details of stations worked, date, time, band, report received (and in the case of listeners the callsigns of stations being worked). Enclose a statement signed by a national society awards manager or two licensed amateurs that QSLs are in the possession of the applicant. Each award costs 10 ircs. Please note that contacts made during the HA DX Contest (see "Contests") may be used for credits for these awards if a log is submitted and application made at the same time.

Three distinguished dxers at the HF Convention: L to r: John, ON4UN; Elner, LA1EE; and Ghis, ON5NT

Contests

Vermont QSO Party
0001 6 February – 2400 7 February
An excellent chance to work a rare state. Activity will be in the first 25kHz up from the beginning of the US General Class phone band segment and around 3·54, 3·72, 7·04, 14·04, 21·04 and 28·04MHz on cw. Exchange RS/T and country, VT stations will indicate their county. Phone QSOs count one point, cw or rtty two, and there is a bonus of 20 points for working W1BD. Stations may be worked on each mode on each band. Send entry to D Loverin, WA1PDN, 50 Liberty St, Montpelier, Vt. 05602, USA by 1 March.

In the 1987 **HA DX Contest** single-operator multi-band section **G3ESF** scored 85,680 points, G3SJX 63,540, **GM3CFS** 49,932, G4OKN 47,541, G3DFV 35,100, G8VF 27,918, G3KXF 11,964, and GM8SO 5,850. In the single-band category on 3·5MHz **G4RKK** scored 10,320, on 7MHz **G4OVD** scored 9,800, and on 14MHz **G6NK** 8,322, **G3DCA** 5,400 and **GM4ELV** 4,950 points. Certificate winners are listed in bold type.

AGCW-DL QRP Winter Contest
1500 16 January-1500 17 January

AGCW-DL HTP80 Streight Key Party
1600-1900 6 February
Photocopies of rules of these are available from me – please send an sase.

UBA Contest 1988
1300 30 January – 1300 31 January (CW)
1300 27 February 1300 28 February (SSB)
UBA announces that this contest is under the patronage of Mr Ripa di Meana, member of the EEC Commission for Communication, Information & Culture. It will cover all bands 3·5 to 28MHz and be confined to IARU contest preferred segments on those bands which have them—ie 3·5 and 14MHz where they are 3·5–3·56MHz and 14·0–14.06MHz on cw, and 3·6–3·65 and 3·7–3·8MHz and 14·125–14·3MHz on ssb. There are two classes: A single operator single-band; and B single-operator multi-band. Only 18h maximum operating time is allowed in either. Exchange RS/T plus serial number (from 001). In addition, ON stations will give their province abbreviation. OSOs with ON, DA1 and DA2 count 10 points, with other EEC countries three, with others one. Own country may be contacted for QSO points only once per band. The multipliers are the ON provinces (nine in all: AN, BT, HT, LB, LG, LU, NR, QV and WV), the prefixes ON4, ON5, ON6, ON7, ON8, ON9, DA1 and DA2, and other EC countries (DL, I, F, LX, G, PA, EI, OZ, SV, CT and EA) each counts once per band.

Logs should show time, station worked, reports and serial numbers exchanged points, and multipliers claimed. Use separate sheets for each band end enclose a summary sheet showing scoring information, periods off the air, class, mode, name, callsign, full address and the usual signed declaration. Logs must be postmarked within 30 days of the contest and sent to: UBA HF Contest Committee, Jen Galicia, ON6JB, Oude Gendarmeriestraat 62, B-3100 Heist Op Den Berg, Belgium. The new "UBA Contest Award" will be sent to the top station in each class in each country, and a special engraved plaque donated by ON6JB will be awarded to the first entry in Class B of the ssb contest who proves all 28 multipliers have been worked.

Hungarian DX Contest 1988
2200 16 January to 2200 17 January.
Single-operator single and multi-band and multi-operator multi-band sections. 3·5 to 28MHz cw only. Exchange RST and progressive serial number—HA stations will also give a two-letter code to indicate their county (a maximum of 20 per band). OSOs with Hungary count six points, with other continents three points, with own continent none. Separate log for each band and enclose summary sheet with signed declaration. Post within six weeks to HRAS Contest Bureau, H-1581 Budapest, Box 86, Hungary. Application for various awards can be made using the contest log—these include the WHD, Savaria, Pannonia, Dunakanyar/DD, Balaton/BD and Budapest/BP.

CQ WW 160M CW Contest
2200 29 January – 2200 31 January (cw)
2200 26 February – 2200 27 February (ssb)
Single- and multi-operator. Exchange RS/T and serial QSO number (from 001). USA and Canadian stations will indicate their state/province. QSOs with own country count two points, with other countries in the same continent five, and with other continents 10. Each state, province and dxcc country counts as a multiplier, but W and VE do not count. Three QSO credits will be deducted for each unmarked duplicate, false, or unverifiable QSO removed from a log. Sample log sheets and entry forms are available from CQ 160 M Contest, 76 North Broadway, Hicksville, NY, 11801, USA. In exchange for a large sae and some ircs (please note that I do not have a supply of these forms). Other forms may be used if they have 40 QSOs per page with columns for date, time, exchanges sent and received, if multiplier, and points claimed. The usual signed declaration must be enclosed and the mailing deadline for the cw section is 28 February and for ssb 31 March. At the time of writing, the 1988 rules had not been received but the 1987 contest entries were sent to Donald McLenon, N4IN, 3075 Florida Av, Melbourne, Fla, 32904, USA.

Results of the **1986 CQ WW DX Contest (CW section)** are now available and UK scores are as follows:

SINGLE-OP SINGLE-TRANSMITTER

Callsign	Band(s)	Points	Callsign	Band	Points
G3MXJ	All	1,641,150	**G3HCT**	(21MHz)	205,288
G4BUO	..	1,521,874	G3LNS	..	188,622
G4OBK	..	755,425	**G4RKK**	..	75,338
G3UFY	..	527,672	**GW3KYA**	..	23,816
G3NKS	..	344,148	G6QQ	..	19,110
G3ESF	..	298,410	**G4CP**	(14MHz)	204,972
GW3Jt	..	219,596	G3RZP	..	203,118
G3GRS	..	200,152	**GM3RAD**	..	38,772
GB8WR	..	152,092	**G3FXB**	(7MHz)	320,688
GM3CFS	..	140,139	G4CNY	..	222,138
G3SJX	..	115,364	G3YDV	..	52,564
G4ZFE	..	105,696	**GI4BBV**	..	43,948
GW4RHW	..	101,830	G4RFE	..	19,256
G3PFL	..	94,608	G4MPK	..	6,720
G4OKN	..	78,225	**G4FAM**	(3·5MHz)	142,310
GM4MFL	..	70,325	G4WVG	..	30,336
G3GGS	..	57,000	G4ARI	..	9,844
GD0AVF	..	49,816	GB2RIP	..	1,813
GM8SO	..	26,596	**G3XTT**	(1·8MHz)	39,270
G4ZME	..	6,476	G4VGO	..	29,260
G0AEV	(28MHz)	3,150	**GM3ITN**	..	10,260
G3UFY	..	910	G3BDQ	..	6,380

In the **Multi-operator Single-transmitter** section **GJ0AAA** scored 4,257,048 points, and **GB4DX** 2,130,624.

In the **QRP** section **G4ELZ** came world fourth in the multi-band listing with 244,860 points and G3KDB scored 155,112. On 14MHz G3LHJ scored 11,720 and GM4HQF 4,890. On 3·5MHz **G3VMY** scored 11,997 and G3ICH 420. Congratulations to certificate winners (listed in bold type).

Please note that in the results of the 1986 CQ WW DX Contest (CW), GB8NR's callsign was given as GB8WR.

1987 ALL-BAND TABLE No 5

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
GW4RHW	30	56	69	205	114	38	512
G4OTU	35	36	70	128	15	69	453(all cw)
G4ODV	33	47	131	66	44	32	353
GM3YOR	44	55	108	61	52	32	352(all cw)
G3TXF	36	41	74	140	39	18	348(all cw)
G4OBK	48	61	78	65	22	23	297
4X4FL	–	10	37	53	82	62	244
G4GOF	7	17	20	54	10	2	110
G0GYD	1	5	41	35	20	2	104
G0HGA	–	21	6	22	25	–	74(QRP cw)

Next deadline-scores to reach G3GIO by 8 January 1988

10MHz COUNTRIES TABLE

	All-time	1987
G3PJT	101	71
G4YWG	64	49
G4VDX	71	37
G4OBK	57	36
G4YSN	1	1

QTH CORNER

CR9BZ OH2BH, Nuottanamantie 10 D 20, SF-02230 Espoo 23, Finland.
F8AJA J M Duthilleul, 515 rue du petit hem, Bouvignies 59870 Marchiennes, France.
FY5YE (CQ Contest) W5JLU, 1321 Lamar Av, Nederland, Tx, 77627, USA.
P40A KA1ZN, 179 Knollwood St, Springfield, Mass, 01104, USA.
P40P via WA6AHF, 1794 Via Alamitos, San Lorenzo, Cal, 94580, USA.
S0RASD EA2JG, Las Vegas 69, Luyando, Alva, Spain.
S79WS via DJ6QT, an der Klostarmauar 10, D-6476 Hirzanhain, FR Germany.
SV9ABG PO Box 1333, Heraklion, Crete 71110, Greece.
VP8GPZ via GW8VHL, 7 Old Road, Baglan, Port Talbot, W Glam SA12 8DR.
VS6DO (new) WA3HUP, 2485 Lewisberry Road, York Haven, Pa, 17370, USA.
XE2GKG via Yasme Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
XU1SS KPLNF, Att'n Chou Hiang, PO Box 19-74, Nonthabury, 11000 Thailand.
ZD8M0 G4MAB, or Box 1, Ascansion Is.
5R8VT K5VT, Dr V Thompson, 5227 E Osborn Road, Phoenix, Ar, 85018, USA.

1987 28MHz COUNTRIES TABLE

G3VOF	–	159(ssb)	G4NXG/M	–	81
G4JBR	–	154	G4DXW	–	78
G4VPM	–	147	G0DNV	–	70
G4XAH	–	145	G0FYO	–	70
G3XQU	–	130	G4RWP	–	39
G4MUW	–	108(ssb)	G0BXO	–	35
G0AEV	–	105	GM4CHX	–	33
G4OBK	–	94	GW4TEJ	–	27
GD0ELY	–	92	G4IDF	–	25
GD4XTT	–	89	G5HD	–	10(QRP cw)
G0AGP	–	88	G4YWG	–	9

The final table will appear in the March issue – scores please as soon as possible after 31 December 1987. A 1988 table will be run – in view of the rapidly improving conditions this should really be an active one.

Band reports

More encouragement from G8KG to start the new year: "It begins to look as if the progress of Cycle 22 can best be described as "precocious". In October, with the cycle only 13 months old, the provisional monthly sunspot number leapt to 61·6 (mean solar flux 98sfu). Even the mighty Cycle 19 took just over 18 months to reach this point, while 18 and 20 both needed 20 months. It is tempting to think that this rapid rise presages a really high maximum, but it is much too soon to jump to such a conclusion. What can be said is that a 'below average' cycle is most unlikely. On the strength of the July sunspot data, Boulder raised their prediction of the peak from 126 to 136. It will be interesting to see what will happen when they feed in the October figures.

The high activity in October meant that the 27-day average solar flux just touched the 100sfu mark, a value not reached since June 1984. This is not only a convenient bench-mark but is round about the value at which reasonably reliable transatlantic contacts are to be expected on the 28MHz band during the winter months, particularly in November and early December when the seasonal increase in northern hemisphere mufs is at its highest. At the time of writing, 28MHz had been open to N America for 14 successive days and for at least 21 days out of the past 30, the best day being 9 November with a good opening to VK6 and VK8 and good propagation extending to the mid-West by 1630. 1988 could be an interesting year on all the hf bands."

A lot of interest this time on the hf bands, particularly 24 and 28MHz. It's a pity that we in the UK still don't have full use of 18 and 24MHz, but until we do there is nothing to prevent a few cross-mode QSOs. GW3AHN has already exceeded 100 countries on all three "WARC" bands—which shows what can be done even with limited access to two of them!

Thank you to the following who provided information this month: G2HKU, G5JL, GM3CSM, G3s GVV, KSH, VOF, YRM, GM4CHX, G4EHQ, GM4ELV, G4s FMO, JBR, GW4KGR, G4s MUW, NXG/M, OBK, UZN, XAH, GD4XTT, G0s AEV, BKE,BZP, GD0ELY and G0EVJ.

As usual callsigns in italics were of stations using A1A.

1·8MHz 0500 *VE1, VE2, W1-W3, W8, W9*
3·5MHz 0200 SUtER,tl600 EA9RM, tlH2MC, P40R, VP9AD, *9LIGG*, **1800** ZL4BO, **2000** *JA4CQS*, YB6MF, **2100** C30W, VE2, Wt, **2200** OD5VT, Wt-W4, **2300** *LU2EU, UA0WR, VU4GDG*, 5B4OA, *9H1CL*.
7MHz 0000 SUtER, *VU2SV*, 3C1MB **0200** 5T5BC, **0500** FJ5BL, HC8DX, VE7, *W6-W7* (to 0810), **0600** D44BC, NP4A, P40V, *RIA* (Ob1.t69), *ZL1-ZL3*, **0700** *FK0AW, KL7KJ*, **0800** KP2A, VK0GC, **1800** *9Q5DA*, **1900** *5A5HS* (?) **2000** VK8AW,

HF F-layer propagation predictions for January 1988

The time is presented vertically at two-hour intervels 00(00)gmt for each band, ie 00=0000, 02=0200, 04=0400 etc.
The probebility of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, end so on. Additionally 50MHz F-layer and and 1·8MHz openings ere indicated by a plus (+) sign in the 28 and 3·5MHz columns respectively.

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
++ EUROPE								
MOSCOW	.....331....	....1552....	....3886....	....69882...	....88886...	32.576668412	985643346878	++53....3+++
MALTA	.....221....	....2443....	....57763...	....78886...	....887882..	462565568853	998743236898	++++4....3+++
GIBRALTAR	......1.....	.....221....	.....5543...	....27876...	.....78883..	232.86667842	888664335898	++++3...25++
ICELAND	.....	.....11....	.....441...	.....3673...	.....78881..	....4777871.	564.65436864	++++42.235++
++ ASIA								
OSAKA	.....	.....1.....	....3.....	....62.....	...164123..1	1...31114543	.....45.	
HONGKONG	.....	....21.....	....54.....	....662....	....6641....	1...343321..	2....1114554	.....4+4
BANGKOK	....241....	....473....	....6861....	....6873....	...136664...	2...13346211	3....1114667	.....4+5
SINGAPORE	....2541....	....4763....	....6886....	...158871...	...136675...	2....3346213	2....1114676	.....4+4
NEW DELHI	....331....	....553....	....6761....	...16773...	...235661...	41.112344114	731....114678	5.....4++
TEMERAN	....4541....	....6763....	...17886....	...277871...	1..544665...	642311346434	9731....14778	+5.....4++
COLOMBO	....3542....	....5764....	....6787....	...146882...	...123666...	12....346435	52.....14778	3.....45+
BAHRAIN	....4431....	....6653....	...17776....	...366772...	1..533566...	7422..246545	873....14788	+5.....43+
CYPRUS	....4654....	....78761...	...188884...	...388886...	22.676678311	885643457877	997311125788	++4.....25++
ADEN	....4543....	....6665....	...166773...	...355685...	2..422468211	8122..136776	863....13788	+4.....435
** OCEANIA								
SUVA/S	.....	.....	.....21....	.....143....	.....4662...	....243462..	....311143..	.....
SUVA/L	....1.....	....31.....	....642..1..	....8642132.	.11.86554631	..136333552.	...231.132..	.....
WELLINGTON/S	.....	.....1.....	.....241....	.....563....	....26661....	.....54345...	....311242..	.....
WELLINGTON/L	.....	.....	.....11.....	....42...11.	.11.75311431	..116323442.	...131.131..	.....
SYDNEY/S	....111.....	....2321.....	....5654....	....7776....	...176673...	....1443461..	....1111451.	.....3..
SYDNEY/L	.....	.....	.....3.....	.....52...1.	....3643134.	44334741	....21.1251.	.....2..
PERTH	....3431....	....5653....	....7876....	...168772...	...136666...	2....3346433	.....1.14763	.....44.
HONOLULU	.....	.....	.....	.....	.....2..	......2124..	..31311132..	....4.....
** AFRICA								
SEYCHELLES	.....143....	....2265....	...134773...	...234685...	2..211468311	8.1....136776	831....13788	+2.....45+
MAURITIUS	....2543....	....46651...	...156784...	...244686...	22.211368421	851....136887	83.....13788	5.....44+
NAIROBI	....4343....	....55662...	....66685...	...2545771..	3..421258532	8522....26887	873.....3688	+5.....4++
MARARE	....12441...	....23663...	....45676...	...14447821.	44.322247753	9832....15898	873.....2688	+4.....3++
CAPETOWN	.....1552....	....13765...	....446771..	....4456742.	43.132236764	9842....3699	873.....378	+4.....5+
LAGOS	....36553....	....37765...	....776782..	.1..7555752.	45.152226875	89553...3799	7884.....488	5++.....++
ASCENSION Is	.....4224....	....26446i...	....575573..	.1..7645632.	453.73223664	89834....389	88851....159	+++3.....2+
DAKAR	.....3544....	....17766i...	....387673..	....6755762.	343.75224764	888252..1489	87872....269	+5+4.....3+
LAS PALMAS	.....4543....	....16765...	....388882..	....6888851.	232.87667852	788475435798	989852112389	++++2....2++
** S. AMERICA								
Sth SHETLAND	......112...	.....12341..	....245563..	....5666541.	233.76533332	46625321.123	234321.....1	.....
FALKLAND Is	.....134....	.....23551..	....155663..	....3765441.	233.76422232	5782631...24	467531.....1	.343.....
R DE JANEIRO	.....11.1...	.....32121...	.....64343...	.....753441.	223.36321343	788263....36	88973.....14	+++5.....2
BUENOS AIRES	.....1.2....	.....12131...	.....35353...	....1654431.	123.56421122	6782631...14	689731.....2	3++5.....
LIMA	.....343....	.....6651...	.....8763...	.....8653...	...1...63211.	3471323....2	588641.....1	2++5.....
BOGOTA	.....333....	.....5651...	.....7763...	.....7654...	....1263222.	336.4331..13	689641.....2	4+55.....
** N. AMERICA								
BARBADOS	.....343....	.....6551...	.....18663..	.....48555..	...1..6632331	4461343...35	887641....15	++45.....2
JAMAICA	.....33....	.....2641...	.....5763...	.....7754...	.....65222.	224.3332..13	6785411....2	4+55.....
BERMUDA	.....133....	.....2551...	.....5763...	.....7765...	.....365343.	224.14321234	8785411....15	++55.....2
NEW YORK	.....22....	.....541...	.....2773...	.....4875...	.....56552.	123.12332232	77833111...14	+++5.....
MEXICO	.....22....	.....44....	.....762..	.....863..	.....16421.	123.12331...1	3783411....	.5+5.....
MONTREAL	.....22....	.....44....	.....2762..	.....4875..	.....66662.	123..3343342	77833111..114	+++5.....2
DENVER	.....1....	.....2....	.....51..	.....273..	.....5651.	122....43221	3782311...1	.5+5.....
LOS ANGELES	.....	.....1....	.....31..	.....62..	.....164..	.22..2.3421.	257231.11...	.3+5.....
VANCOUVER	.....	.....	.....	.....11..	.....54..	121..1.2642.	367131.13111	.3+5.....
FAIRBANKS	.....	.....	.....	.....	.....11..	12...212462.	344.31113532	.234.....2..

The provisional mean sunspot number for October 1987, issued by the Sunspot Index Data Centre, Brussels, was 61.1. The maximum daily sunspot number was 101 on 15, 16 October and the minimum was 22 on 24 October. The predicted smothed sunspot numbers for January, February, March and April are respectively: (classical method) 32, 33, 34 and 34, (SIDC adjusted values) 38, 39, 40 and 41.

ZC4DX, *4S7RO*. 2100 *SU1MR*. 2200 *FM5CW, JA7HUS, UA0GO, VK6HD, VU4GDG, 9Q5DA*. 2300 *PA0GAA/ST2, YB0WH, 8Q7AIT*.

10MHz 0700 *VK2, VK3*. 1900 *ZS6CS*. 2300 *N5VV (N.Mex)*.

14MHz 0600 KC4USV. 0700 AH2AN, *BY4SZ*, C21XX, FK8FI, KH6AC, T30BC, VK, ZL. 0800 BY1SK, BY5RT, FK8s *FG, FS*, KL7Y. 0900 VK9NI. 1000 KX6BA, *TI4KO*. 1100 *BY4RB*. 1144MB, HV1CN, *KC6SZ*, P40A, P40Z, *4K0E*. 1200 *UA0SV*. 1300 *HK0BKX*, XX9G, 9N1MC. 1400 SU8ASD. 1600 S79WDW, T5GG, PA3AXU/SU5, VU. 1700 FR G FH4EC, *4K1C*. 1800 *KL7I9*, VU4GDG, ZD7JAM, *5R8GT*. 1900 HC8DX, *KL7, OY6FRA*, T5GG, W7, ZD7XY, ZL4JO. 2000 *G3YCM/C6A, KA4B/PJ7*, VP8VK, W7, ZD7XY, 5X5GR. 2100 FH5CB, VK5MC, *VP8BAW*, G3LJF/VP9, 2200 J28BN, JA *LU1ZA* (S. Orkney), VP8HNX. 2300 *V6EA*, 9K2DZ.

18MHz 0800 EA8AGF, VK3NC, ZL1, ZL2. 1600 *PY2AMI, PY3MAL*.

21MHz 0700 5Z4DU. 0800 A92FV, BY4C, HL0J, *VU2ZV*. 0900 BV2FA, BY8AC, VK, VS6BL, ZL1. 1000 TA4A, XX9KA, YI1BGD. 1100 CW4C, *TA1AC*, XU1SS, YB, YJ8NJS, 1200 HL0, VK, YB, *3B1FK*. 1300 *FT8ZA*, HC8DX, HZ1AB, VU2OO. 1500 VE7, W6/W7. 1600 TZ6VV, *XE2GKG, XF1C*. 1700 HC8DX, *KL7YCL*, K4NB/PJ7, VP8BK, W7. 1800 SU8ASD, VP8HKQ. 2000 FY5EM. TR8SA, W6. 2100 *K4PI/PJ7*.

24MHz 0800 *KH2DD*, 0900 *PY2AMI, VK6AKC, VU2LO*. 1100 ZS6AVM. 1200 CU2AF, J37AL, KV4AD. 1300 *FR G/FH4EC*, W1/W4, W8/9. 1500 HK4CZE. *K6STI, KF7E* (N. Mex), *9Q5DA*. 1600 *AY9HGW, G6ZY/EA6, FY5AU*. 9Y4EL. 1700 *HC2SL, II5RK*.

28MHz 0800 BV2FA, BY5RA, JA, 0900 A45XV, *BU2DA*, DU3BAA, JA, SU1ER, VK1,2,4,8, 9V1WP, 1000 A71BJ, AP2P, KH6AZ/DU1, FR4DL, FT8XD, HS0A, KH2D, TA4KA, VK6, VS6BL, VU4GDG, XX9MB, YO1KS4U(=YK), *5R8GT*. 1100 *FR5EM*, J28DX, VK5, VK6, VU2ZAP, 4D0P. 1200 A22RB, A4XXV, FR F5QT, HS0B, JY5OL, S79WS, 4S7NM. 1300 D68AM, FH8CB, FR5ES, *FT8XD*, FY4EE, V31AB, YI1BGD, 4T8A, 5N8ZIN. 1400 A45XV, KP2J, *SM0IGU, PA0GAA/ST2*, TU1BS, ZD8MB, 5T5MH. 1500 CE4FXY, *CE0FFD, EA9IB, HK0HEU, SV9ADH*, ZF2JV, 6W6JX, 9L3SC. 1600 AY6OF, FP5HL, SU1ER, W1-WS, 8-0, ZD7AF, ZD8MB, ZS7ANT. 1700 KI2AH, S0RASD, ZS3BI. 1800 D44BC, TZ6VV, KV4AD, VP8s BKK, MI, XE1L. 1900 FG5BG, 3X0HBR. 2300 *CE0FFD*.

Acknowledgements to the following for items extracted: the *DX Family Newsletter* (JH1KRC), *DX'press* (PA3CXC), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), *The Ex-G Radio Club Bulletin* (GI3OEN/W6), *DX Report* (VK9NS), *Long Skip* (VE3IPR) and *Lynx DX Group Bulletin* (EA2JGO).

Closing date for receipt of material for March issue is 21 January. □

ITU ZONES AWARDS

The RSGB sponsors a series of awards based on working (or hearing in the case of swls) land-based amateur radio stations located in a pre-determined number of the 75 broadcasting zones as defined by the International Telecommunications Union (ITU).

The basic Worked ITU Zones (WITUZ) Award requires confirmations from 70 of the 75 zones, the relevant contacts to have taken place since 1 January 1984. A handsome plaque, bearing the name, callsign, date and number of the award, is also available to all recipients on payment of an additional charge.

Any amateur who is able to provide evidence of working all 75 zones, a real *tour de force*, will be able to claim (for a modest charge) a suitably engraved cup.

The RSGB has also introduced a live-band version of the Worked ITU Zones Award. The starting date for this is 15 November 1945, and the award is available in five classes as follows:

5BWITUZ Supreme ... 350 stations
5BWITUZ Class 1 ... 325 stations
5BWITUZ Class 2 ... 300 stations, with a minimum of 50 on each band
5BWITUZ Class 3 ... 250 stations, with a minimum of 40 on each band
5BWITUZ Class 4 ... 200 stations, with a minimum of 30 on each band
(Each station should be located in a different ITU zone per band).

Certificates will be issued to winners of all classes. Additionally, as in the case of the WITUZ award, winners of the Class 1 Award will be eligible to claim a handsome plaque, suitably inscribed, while winners of the Supreme Award will be eligible for an engraved cup. With these, as with other RSGB hf awards, it is the Society's intention to stimulate interest in the awards by publishing details of award winners, with suitable write-ups, shack photos etc in the case of winners of the higher classes of award.

The boundaries of the 75 ITU zones are not always well defined, although the *DXNS Prefix/Country/Zone List* published by Geoff Watts is a good guide. The awards manager will use the *Radio Amateurs Prefix Map of the World* (published by Radio Amateur Callbook Inc) as the final reference. Exceptionally, the island of Minami Torishima, which lies outside the 75 broadcasting zones, will be accepted for credit for one missing zone and, in the case of the 5BWITUZ, for one missing zone per band.

Details of all RSGB HF awards can be obtained from the awards manager, GW4BKG, to whom all applications should also be made.

VHF/UHF

*Ken Willis, G8VR**

TEP

When Ray Cracknell, G2AHU, suggested that 50MHz beams be turned towards the south during October to catch any possible transequatorial propagation extended by sporadic-E, there must have been many who thought that this was stretching the imagination a bit far, even for those of us who like to dream about the ultimate vhf dx. In the event, things turned out just as Ray had hoped, with incredible contacts made and new records established. It started in the UK on 8 October when Mike, G3JVL (Hants), heard David, A22KZ (Botswana), on 50.110MHz calling CQ with ssb. No contact resulted, but since 9H1 stations were being copied on the band at this time, it seems that there was sporadic-E present as well as tep.

In mid-morning on 17 October, John, G6XHQ (IO91), heard ZS3E (Namibia) briefly on the same frequency, but the real excitement started on 22 October at 1535gmt, when Eric, G2ADR (York), heard A22KZ on 50.110MHz using cw with pronounced chirp (the signal eventually cleared to T9). Being unprepared to transmit on 50MHz, Eric was lucky to catch the Botswana station on 28.885kHz, and they worked crossband until at 1547 a two-way contact was made, the first A22-G QSO ever made on this band. Eric used a simple dipole and just 9W! A22KZ went on to work, in quick succession, G4HBA (15W, three element); Bill, GM4DGT (first GM–A22 QSO); G1AWP Northumberland (who used cw despite being a Class B operator); Ken, G4GAJ Rochdale (10W to three element), and finally Johnny, G3CCH (Scunthorpe) at 1657gmt. The A22 station was heard again later, up to 1722gmt, without further contacts resulting. Vincent, G3TKN, wrote to say that he has been running a regular sked with David Saul, A22KZ, on 21MHz over a number of years. David had been loaned a Icom 551D and a five-element Yagi by ZS6WB, and previously had worked 9H1 stations and SZ2DH. 9H1FL was using just 2.5W to a groundplane antenna when he worked into A22. Unfortunately David was due to leave Botswana at the end of the last month to return to the UK where he holds call G4EKZ (Ventnor, IoW). David Butler, G4ASR, who edits the *VHF Newsletter*, has written up the story in more detail, and will send a copy of this and a specimen newsletter to anyone who sends a largish sae to PO Box 73, Hereford, HR2 9EW. Just for the record, G5BY worked ZS1P on 50MHz back in November 1947, but this was via F2 propagation at the peak of the solar cycle.

Solar conditions and auroras

Ron Livesey of the BAA reported that his information indicates that the minimum of Solar Cycle 21 occured in September 1986. He says that one surprising fact to emerge was that there were magnetic and auroral minima at the peak of the cycle, and that Dr Legrano of the French National Institute for Cosmic Sciences is of the opinion that "something odd is going on" because the various factors used to predict the maximum levels for Cycle 22, now in its early stages, "do not tie up". For example, using four sets of criteria, the calculation of sunspot number yields four widely-differing results; the first time in many years of study that Dr Legrano has observed this. Boulder's (Colorado) own predictions for Cycle 22 give sunspot numbers at the peak of the cycle between 168 and 185 so, as Ron says, "You can take your pick". There is more of this which I will mention next month. It is interesting that we vhf operators have commented on the fact that there have been some very good radio auroras in recent months, at times when they were not expected to be very intense.

One of Ron's observers at St Andrew's University noted that Andy, GM4IPK, was working on 144MHz during an aurora on 27 October, which was reported in November's *VHF/UHF*. It will be an easy matter to provide Ron with full information on radio auroras to tie in with his team's visual reports. Another Ron, this time GM4FLS (Elgin), observed radio auroras on 22, 25 and 30 September, 3, 11, 12, 13 and 21 October, and 3 November. Some of these penetrated to the south and provided good dx contacts. We need much more activity on 50MHz during auroras, and beacon GB3RMK should be a good indicator since it is favourably placed for this purpose.

Beacon notes

During the good tropo opening in November the Eire beacon EI2WRB (144.920MHz) was much in evidence at my QTH and provided a very welcome indicator that the 144MHz band was open in that direction. If you have not copied it yet, be prepared for a long message format, so it might

6 Lerryn Gardens, Broadstairs, Kent CT10 3BH.

sound like someone operating cw in the beacon part of the band! If I copied it correctly, the message reads CQ CQ CQ de EI2WRB lat 52 d 15 m north long 07 d 20 m west QRA IO62IG 248 mtr asl ant dir 95 d 200 w de EI2WRB, which tells you all you need to know about this excellent beacon.

In the same tropo opening, with an antenna heading of 90° beacons EI2WRB, FX3THF, GB3ANG, GB3CTC, ON4VHF, DL0UH, DK0OE, DL0PR, OZ7IGY, SK7VHF, Y41B and PI7PRO (144.840MHz) were all good signals. This is the first time in more than 30 years of vhf operation that such a diversity of 144MHz beacons were audible at my QTH. Although the signal from GB3ANG was S9-plus, nothing was heard of GB3LER, prompting me to write to a well-known Shetlands amateur to enquire after the health of this beacon. GB3RMK on 50.060 MHz was audible only by meteor bursts during the time that the tropo conditions provided such strong signals from GB3ANG.

The good news for 50MHz enthusiasts is that a new but distant beacon may be QRV by the time this is in print. According to G3ENY and G4UPS, Mike, ZD8MB (G4MAB), on Ascension Island, planned to start up on this band towards the end of 1987 by installing a 25W beacon supplied by G3JVL, a G4FRE keyer and a five-element Tonna donated by Randam Electronics. The frequency is a strange one, 50.0325MHz. The beacon antenna will, initially at least, be directed towards the UK from a site on Green Mountain, some 2,350ft asl. A second five-element antenna is on the way to Mike from the UK, and a 50MHz transverter module has been ordered from the USA, so he will be active on the band as well as on 28MHz where G3ENY has already worked him. (G4ASR reminded me that there is an hf beacon ZD8HF on 28 MHz also). Some sterling work by members of the 6 Metre Group ensured that the gear from the UK was flown out without delay, so all we want now is some F2 propagation or a minor miracle or two, but after what has happened on 50MHz so far, it would not be a bad idea to program that beacon frequency into the memory of the scanner. Apparently all ZD8 amateurs can use the band 50–54MHz. Mike hopes to establish a beacon on St Helena, eventually, and it is understood that permission for this has already been granted.

G3ENY also reported a contact on 14MHz with PJ9EE, who hoped that his beacon PJ4B on 50.015MHz would be operational during December 1987 with fsk keying, sending callsign and locator. The antenna is a vertical half-wave on a very high tower.

One problem Chet is experiencing is that his beacon transmitter tends to shut down due to overheating in the very high ambient temperatures at his location, something we don't often have cause to worry about here!

Geoff Holland, G3GHS, the mid-Cornwall beacon keeper, said that the Cornish beacons were taken off the air in May at the request of the site owners. Rewarding letters and donations were received from all over the British Isles which helped considerably with the financial problems the group was facing. A new mast is planned by the site owners but, pending this, some temporary arrangements were authorised for erecting antennas on the site which permitted the 70 and 144MHz beacons to resume operation on 22 October. The 432MHz beacon produced some spurious signals on the 144MHz band, so it was not activated, but the donation of a new transmitter has been gratefully accepted and it will be put on the air as soon as some necessary modifications have been completed. The group is anxious to install a 50MHz beacon and John Wilson, G3UUT, is co-ordinating this project through the VHF Committee.

The DTI has given tentative approval to the establishment of a beacon on 50·000MHz transmitting timing signals (see *VHF/UHF*, November). The location proposed is Sheffield University, the call GB3BUX.

Expedition to Sutherland

Clive, GW4VVX, and Steve, GW6TGX, went to XS square (IO78) in August to a site 600ft asl. Signing GB2XS on 144MHz, their first QSO was appropriately with GM3JFG, renewing an aequaintanceship which, starting five years ago, has continued every year since. On their last visit they managed only 56 contacts in 14 days, but by the second day of this trip they had already provided 108 stations with a first-time QSO with the square. They regretted that most southern stations tended to look anywhere but north, which made contacts difficult along the path, but three contacts with QRP station G3NBQ in Lancs—worked over a 320-mile path through the Cairngorms rising to 4,000ft – showed that working to the south would certainly have been possible. After the first week they activated GB0LGS, a special event call issued for operation at the Lairg Crofters Show. Anyone who has not visited the region can have little conception of its remoteness and the rugged nature of the terrain. The team learned that there is one operator resident in XS square, but on their five visits there nothing has ever been heard of this station. However, 13 residents are known to be interested in amateur radio and now hold weekly meetings, so this augures well for future activity in the region.

Clive and Steve wish to express their appreciation to one Charlie Baird, who was "first everywhere, drove 10 miles to help erect the mast and was on site two hours before the rest of us with tent already erected". And surely we all wish Charlie the best of luck in the RAE examination which he planned to sit last month. Credit is also due to GM0HBJ for the use of a generator and to the 1st Lairg Guides, Lairg Crofters Committee and to the Village of Laird, Sutherland, all of whom helped in one way or another. Congratulations also to Clive and Steve for having made such a favourable impression on the locals.

GW6TGX and GW4VVX operating from Sutherland last August. *Photo:* Courtesy Charlie Baird

Tropo

If you did not manage to catch the excellent tropo conditions last November, then you missed a great opportunity to work some new squares on both the 144 and 432MHz bands. Somewhat unusually for the UK a high pressure area remained almost stationary over the country for four or five days, as shown on the weather maps for 3 to 6 November reproduced here. As a result, some almost classical vhf tropo conditions persisted for several days, and even the weather man on TVS commented that radio amateurs were enjoying unusually good propagation instead of warning viewers that they might experience interference from Continental stations. Varied and widespread dx was there to be worked right through the day, and the list of beacons audible (see "Beacon notes") gives some indication of the incredible coverage of this event. Towards the weekend with a vhf/uhf contest in the offing, some dozens (it seemed like hundreds!) of OK portables were out operating from mountain sites and so many were worked by UK operators that complaints were heard to the effect that there were "only OKs" on the band!

On 144MHz, GW4HBZ worked 70 OK, 14 SP, 7 SM and 3 OE, plus many Y and D stations. Rhys, GW4RWR, commented on how the propagation swung from the OK direction to southern Sweden towards the end, and further south later after he gave up the chase to watch Wales play the US Eagles at Cardiff Arms Park. His tally was a mere 46 OK, 19 SP, 23 Y, SM, OZ and F. The appearance of so many Polish stations offered the chance to work some rare squares which are not often heard other than by meteor scatter. Rhys commented that he hadn't heard me on the 144MHz band for some time. In fact I used the event to see what could be done using QRP cw on 144MHz, and found it pleasant to work SP and OK stations with 10W to a nine-element antenna, free from QRM and splatter.

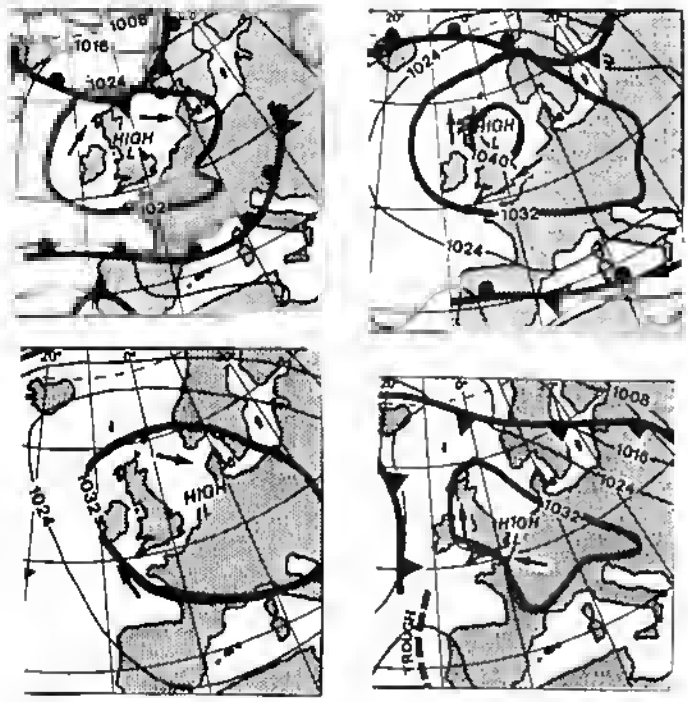
Ian, G4OUT (Stafford) is another who prefers cw. With 25W to a 12-element ZL-special antenna on 144MHz, he had over 70 dx contacts, working two new countries and no less than 20 new squares in four days. Ian said that OK1FM, also operating cw, was using just 3W, so when the mayhem is more than you can bear in the ssb part of the bands, try your luck with cw. You might be surprised at the result, as Jack Hum, G5UM, the vhf awards manager frequently tells us, since he sees the effectiveness of this mode in the award applications which he receives.

Conditions were excellent on 432MHz also. Keith, G6DZH (Wores), made 17 contacts on the band in the event, but to such good effect that they provided him with no less than five new squares. Steve, G6XXE (Yorks), worked 25 squares, best dx being SP9FG. Geoff Morris, GW1ATZ (Clywd), worked three Belgian stations using 10W of 432MHz fm and a 12-element Yagi, vertically polarised from a site 50ft asl. He commented

that much more dx could have been worked if only operators would stop trying to raise distant repeaters, and make calls on the fm simplex frequencies instead.

Conditions on 50MHz bore little resemblance to those on the higher frequency bands, though towards the end G3ENY received a surprising report of S9 plus 40dB from GJ4ICD, far in excess of any previous report received on this band. On 7 November, however, at around 1745gmt, G4UPS and G2ADR, both on 50MHz, worked EA4CGN crossband (28/50), and EA4CGN believes that this was an example of "extended tropo" rather than sporadic-E, judging by what other signals were being heard at the time. This provides food for thought since the two UK stations are located quite far apart, one in Devon and the other in Yorkshire.

However, during a short contact on 50MHz, Martin, G3USF, commented that conditions on both 50 and 70MHz had been very good during the tropo event. It is possible that the low activity on these bands compared with 144/432MHz could give the impression that not much was happening in those parts of the spectrum. We certainly need more activity on both of these bands if we are to exploit them fully.



Weather maps for 3 to 6 November showing the stationary high pressure system which produced outstanding tropo conditions

Repeater news

Geoff Roberts, G3ENY, learned of a novel repeater link-up during a contact with VK6CL, on 14MHz. During JOTA weekend, two Australian radio clubs, one in Sydney and the other in Perth "borrowed" a duplex channel on the AUSSAT geostationary satellite to link the Sydney repeater, VK2RMB (146.875MHz) with the Perth repeater VK6RTH (146.8MHz). The system was set up on 14 October for testing and adjustment purposes, and afterwards carried a continuous flow of traffic until shut-down on the following Sunday evening, giving hundreds of scouts, guides, cubs and brownies the opportunity of talking to others half a continent away. Geoff comments: "It is a sad thought that we, in the UK, would not dare to attempt such a thing on the majority of our repeaters; what a field day the Wallies would have!"

Peterborough Repeater Group was surprised to learn (*VHF/UHF* October) that GB3PO has been co-sited with their uhf repeater GB3PB in Peterborough and could find no trace of it having been put there overnight by persons unknown! The text should of course have confirmed that it is GB3PE, the group's new vhf unit, which shares the site with PB, this being located on the east side of the city adjacent to the A47 trunk road. GB3PE came into service last July to provide service for areas to the east and north-west of Peterborough, where, says G4IPW, coverage was known to be patchy; being on the edge of areas covered by existing repeaters. The building of GB3PE was sponsored by the Peterborough Radio & Electronics Society, and the licence obtained less than a year after the repeater was first proposed. The speed of this authorisation meant that the repeater had to enter service with a temporary logic, still in use until GB8OUU completes the final version. This is based on the Z80 microprocessor as used on GB3PB (RB10). Callsign is sent at 12wpm (1kHz at 1.5kHz deviation) every 10min when the repeater is not in use and during talkthrough, also on closedown and time-out. Access is by 1,750kHz + 25kHz tone-burst (300ms required), following which the repeater is carrier accessed until the transmitter is turned off or timed out (2min). If there is no input signal, closedown occurs after 12s. The logic provides a system of 1kHz warning "pips" when a transmission exceeds 2min duration. Contact officer for the group is Barry, G0AFV, QTHR.

From here and there

F G Whittaker, G1BAA, writing from Benghazi, commented on recent correspondence relating to possible vhf operation from Libya. He says that the only current licence is held by 5A0A, of the University of Benghazi, who was granted the call purely for his propagation studies. G1BAA goes on to say that communication in Libya is very strictly monitored, so anyone operating there unlawfully would be taking great risks. He also thinks that it will be a long time before amateur licences are issued on a more general basis in Libya. He also confirms that the similarity between Arabic and the Maltese language makes it almost certain that it was 9H1CD who was heard on 144MHz, not 5A1CD.

Derby & District ARS will be holding their annual 144MHz contest on Sunday 13 March this year, starting at 1300gmt and continuing until 1700. Any mode can be used by fixed or portable stations who must exchange callsigns, reports, serial numbers and administrative county details. (Scottish stations to send region number). Full details can be obtained by sending an sae to D R Palmer, G1DHQ, 119 Green Lane, Derby DE1 1RZ.

Larry C Hazlewood, W5NZS, Oklahoma City, disagreed with my statement about the "relative unpopularity of the 50MHz band" in the USA, and also to the fact that I said that the trip by W6JKV to Aves Island was primarily to provide contacts on that band for American amateurs. Larry said that Jim, W6JKV, had provided him with no less than nine countries out of the 43 he has worked so far on 50MHz, and that he was awarded the Mel Wilson Award for his contribution to the study of 50MHz E-skip propagation. My comments were in no sense aimed at W6JKV, who does a great job for all of us in operating from countries which are not normally active on 50MHz, and I know that 50MHz operators everywhere would wish me to record their appreciation of his efforts. However, I lived in the USA for nearly 10 years, operating from home, clubs and at field day events, and while recognising that there are, of course, many very dedicated and proficient vhf operators throughout the USA, the interest in vhf/uhf per head of the amateur population in that country is far below what we take for granted in Europe.

John, G4BYV (Norfolk), sent a short tribute to the late Cor, PA0CML, whose death was announced recently in *Rad Com*. Due to an asthmatic condition, Cor could barely speak at times and often used an endless magnetic tape to make CQ calls. John first worked him in 1968 on 144MHz and on 432MHz in the following year. John said that Cor was the first PA station to work 1,000 Gs on 144MHz, and that he was "the Netherlands G2JF". Old-Timers will know what he means.

Roy, G4CMT, "exiled to Humberside from the City of London for the past 45 years", claims the first-ever "parachute mobile" contact on 144MHz, made using fm on 7 April 1979. During his descent from 3,500ft, he made no less than 13 contacts in 85s. It was his first jump, made on his 55th birthday!

Happy New Year, everyone

MICROWAVES

*Mike Dixon, G3PFR**

Beaconry

How many microwave beacons are on the air? Answer, not enough! How many beacons have you heard, either from the home QTH or out portable? Answer, not a lot, particularly above 1·3GHz!

Beacons on the 1·3GHz band are slowly becoming almost commonplace, since the repeaters (both speech and tv) all act as beacons when not relaying received signals.

You may ask "what use are microwave beacons?". Well, they serve a variety of purposes, such as:

1. Indicators of short-term "lifts".
2. Provide signals for longer-term propagation studies, particularly on long or difficult paths.

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

3. Frequency markers for equipment and antenna alignment.
4. Indicators that your receiver is working properly and is still aligned where you thought it was!
5. They support valuable experimental work by amateurs.

Microwave beacons tend, by their very nature, to have quite restricted "service areas" and are, in any case, rather sparse in their distribution around the country. **Formal** beacon licensing can take a very long time and the technical standards required for unattended, 24h/day, 365-days/year operation, are quite stringent [1]. Such beacons are allocated a frequency and a callsign in the GB3 plus three series, or GB3 plus two, if a repeater-beacon.

So . . . . why not build and operate your own informal, portable mini-beacon to provide signals for purposes 1, 3, 4, and 5 above? After all it is acceptable practice during microwave (or vhf/uhf or meteor-scatter) skeds for the participating station(s) to leave an identified signal running until such time that the path loss falls to the level where signals can be heard. Provided that you can satisfy your licence conditions, there is no reason why you cannot do this with a "personal" beacon. The conditions to be met are:
1. The "station" (beacon) must always be attended.
2. Suitable identification must be given at the appropriate intervals.
3. A suitable means of frequency stabilisation must be employed.
4. A suitable means of measuring frequency must be available (and used!).
5. Mode and power allowed by the licence must be used.
6. Appropriate receiving equipment for the transmission band must be available (and used!).
7. The transmissions must cease immediately on receipt of an official request for close-down.

A basic beacon block diagram is shown in Fig 1, with several options indicated. Let's take a look at the modules, one-by-one. Module 1 is the power supply. For shack use this can be a straightforward, well-smoothed, noise and rf-free "standard", nominal, 12V psu. Masthead mounted beacons can be fed their power through cheap coaxial cable to prevent undue rf pickup. Additionally, bypassing should be provided at each end of the power feed cable. For portable use a non-spillable gel-acid or motorcycle accumulator can be used equally well.

Module 2, the frequency source or local oscillator, can be a variety of devices as indicated in the diagram. For the 1·3GHz band, the G4DDK source board [2], suitably crystalled, is sufficiently "clean" to be used directly into an antenna as a mini-beacon. FM (fsk) ident and keying is simply applied by means similar to that usually employed on the Microwave Committee 384MHz ("Balloon") board source [3]. You may need to fit an adjustable resistive divider between the recommended G4FRE generator/

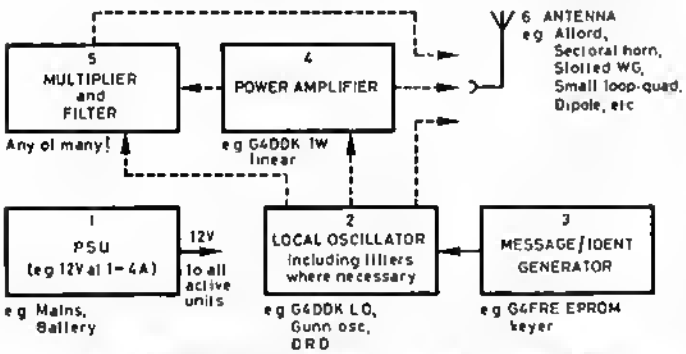


Fig 1. Building blocks for beacons, showing many possibilities

keyer [4], module 3, and the source (module 2) in order to control the amount of frequency shift produced. Artwork or boards for this keyer are now available via G4FRE and Microwave Committee members are prepared to "blow" your message into eprom — all you need supply is a suitable blank eprom, the message(s) needed and return postage. All the other components should be available from your local components supplier.

If more power is needed, then the G4DDK 1W linear amplifier [5], module 4, may be used between the source and the antenna. With this source spurii are so low that no further filters should be necessary at the amplifier output. Boards will be made available if there is sufficient interest — let us know!

For bands above 1·3GHz, eg 2·3 and 3·4GHz (note: beacons are not permitted on 5·7GHz at the moment), any of the "standard" varactor multipliers (module 5) including many of the designs in *DUBUS* and *VHF Communications*, as well as in the *Microwave Newsletter* and *Rad Com*, can be used. Alternatively, mount a varactor in an interdigital filter, just as you would for an interdigital receive converter. The efficiency may not be as high as an optimised design but will, nevertheless, satisfy most simple beacon needs while at the same time suppressing unwanted products to an adequate level.

For 10 or 24GHz, you can either use a multiplier followed by filter to generate a narrowband beacon signal or a Gunn or DRO to generate a wideband signal directly. For multiplying to 10GHz, the DK2VF multiplier (6) is especially recommended: driven with 1W of 1,152MHz, you should get of the order of 100mW filtered output at 10,368MHz. Suitable filters would be a four-cavity iris-coupled 'JVL 60MHz filter or a simpler post-type filter. Both are described in the *VHF/UHF Manual* (3rd or 4th editions). A similar multiplier could be used for 24GHz, although the dimensions would be around half the size and the accuracy needed would be more than double that required at 10GHz. Filters likewise!

It is much easier to use a Gunn or DRO and use the audio side-tone of the G4FRE keyer to provide wideband fm modulation. Provided that a few simple precautions are taken, their stability is quite adequate for WB purposes. These precautions are:
1. Make sure the regulator/modulator unit used is free from noise and unwanted rf or hum pickup.
2. Make sure it is free from spurious supersonic oscillation, especially where op-amps are used to control a pass transistor.
3. House the whole unit—keyer, psu/modulator and Gunn/DRO—in a diecast box which provides screening and thermal stability. The unit will drift, but very slowly, with ambient temperature changes.
4. If available, fit an isolator between the Gunn/DRO output port and the antenna.
5. Waterproof the output port (waveguide) by means of a sheet of thin polythene clamped between the diecast box wall and the flange of the output waveguide.

Module 6 is the antenna. For a well-sited beacon, eg portable, a very simple antenna can be used: at 1·3 and 2·3GHz a matched dipole, "clover-leaf", "mini-wheel" or Alford Slot makes a neat system. Remember that all beacons and repeaters are **horizontally** polarised! For short-term use, the antenna can be weatherproofed by taping it up inside a plastic bag or even by using "cling film". More permanent installations may mean using or making a suitable plastic or glass-fibre "radome"—much is up to individual ingenuity!

At 10 or 24GHz, the simplest antenna is open waveguide with 6dB gain! A small sectoral horn with 10 to 12dB gain will give an azimuth pattern of nearly 180° with gain in the elevation plane. Two horns, back to back, fed by a waveguide T will increase the azimuth pattern to almost 360°, with a couple of deep nulls off the sides. A stacked, slotted waveguide antenna is more elaborate but can give very good results as either a semi-omni or omni. Design programs for slotted antennas (7) and horns (8) were given some time ago in the *Microwave Newsletter* and are recommended for anyone contemplating design of such useful general purpose antennas.

Conclusions

Beacons, however small and simple, can be of inestimable use to both yourself and other microwave operators. Since you may already be building some of the modules outlined for other purposes, why not build yourself a mini-beacon? It will be an invaluable aid to building and operating other microwave equipment and, as has been shown, there can be no "official" objection (under the terms of your licence, provided these are observed) to such devices. Building and operating a mini-beacon from home or out portable may even encourage you to have a go at designing, building, installing, operating and maintaining a formally-licensed, full-time beacon.

See you in beacon mode? (But please observe the band plans!)

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(1) *Guide to Beacon Licensing*, available from RSGB HQ.
(2) "A local oscillator source for 1,152 MHz", G4DDK, *Rad Com*, Part 1, February 1987, p128; Part 2, March 1987, pp199-201.
(3) "A high-quality uhf source for microwave applications", RSGB Microwave Committee, *Rad Com*, October 1981, pp906-910.
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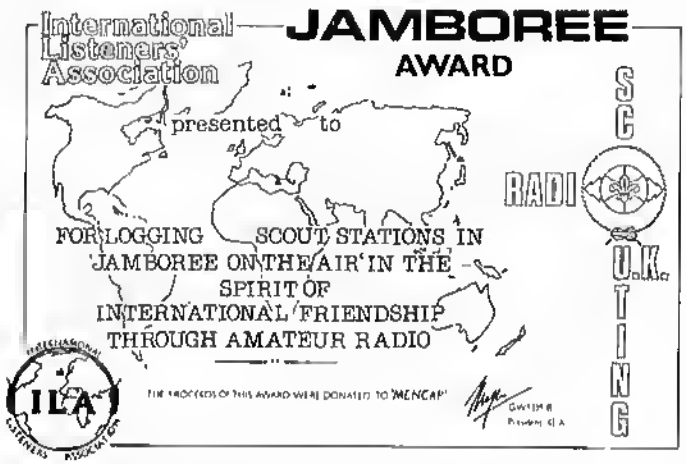
(5) "A 1W amplifier for the G4DDK 1,152MHz local oscillator source", G4DDK, *Microwave Newsletter* 07/87, (October/November 1987). RSGB.
(6) "A frequency multiplier for narrowband 3cm band comunications", DK2VF and DJ1CfR. *VHF Communications*, Vol 11, issue 2/1979, pp66-73, UKW Verlag.
(7) "Design and construction of slotted waveguide antennas", G8AGN, *Microwave Newsletter* 01/87 (April 1987), RSGB.
(8) "Horn design package", G8AGN, republished in *Amateur Radio Software*, GM4ANB 1985, RSGB. □

SWL

*Bob Treacher, BRS32525**

International Listeners' Association

GW4OXB continues to front this thriving organisation which had 260 listener members as at 1 November. Twelve countries are represented. The ILA has been represented at several rallies, when Trevor is able to meet some of the faces behind the BRS numbers. It offers a number of awards for listeners, and a copy of their Jamboree Award is reproduced here. GB2ILA will be active over the weekend of 9/10 January, and special QSL cards will be available for all swl reports. Further details of the ILA can be obtained by sending an sae to GW4 OXB, QTHR.



BRS41542 tripole sloper

In the November *SWL* Column I mentioned Peter Riley's "Tripole sloper – Mk2". Following this, Peter received 94 enquiries – from both amateurs and listeners—wanting more information. For those, he has asked me to mention that the transformer primary which was 31 turns (centre tapped) has been amended to 15 turns (centre tapped) to suit all-band operators. For any new readers, he will be pleased to send a copy of his information sheet about the antenna, on receipt of an sae to P I. C Riley, 20 Arthog Road, Hale, Altrincham, Cheshire WA15 OLY.

HF contests

Normally at the beginning of each year, I try to plug all the major swl contests to jog a few memories. In 1988, there is a wide choice of good events which I hope will attract a large entry. Some of the following dates are subject to change, but note these in your diaries now and check here or in "Contest News" at the appropriate time.

1-31 January – LF Challenge	9-10 July – RSGB SWL
17 January – White Rose LF SSB	17-18 September – CVRS CW
31 January – White Rose LF CW	24-25 September – CVRS SSB
6-7 February – RSGB 7MHz SSB	9 October – RSGB 21/28MHz SSB
20-21 February – RSGB 7MHz CW	16 October – RSGB 21MHz CW
26-27 March – UBA Trophy SSB	29-30 October – HF Challenge SSB
28-29 May – UBA Trophy CW	26-27 November – HF Challenge CW

Around and about

John Gamlick, BRS44375, who used to be a regular contributor to this piece, is temporarily unable to continue with the hobby, but he kindly donated a copy of *Secrets of Ham Radio Daring* as a prize for the leading British Isles entrant in my recent HF Challenge.

Malcolm Harrington, BRS20249, had been busy with family commitments which had limited his listening exploits. However, he heard CE0ZIJ on Juan Fernandez Is on 7MHz for a very good new country. Following mention in an earlier column about ssb on 24MHz, Malcolm had found some activity to monitor and had heard strong signals from KV4AD, together with stations from VE and W. In view of this activity, it might be worth a look at 24MHz—around 24,950KHz—when 28MHz is open.

One swl who listened in the ssb leg of the CQWW contest but did not enter the Challenge was GW1XUD (exBRS36797). He enjoyed his time around 14MHz and logged many of the strong European signals which always appear when there is a contest on! He queried why he could hear the so-called Russian vhf prefixes—RA, RB, RC—on hf. The Russians have had a major shake-up in their callsigns, and it is now quite commonplace to hear Russians with "R" prefixes on the hf bands. RB5FF, RW0AA and RA3PA are three callsigns which immediately come to mind.

While on the subject of CQWW, the late arrival of November's *Rad Com* had delayed much of the copy for this issue, and with it comments about the contest. However, from this QTH conditions on the Saturday were exceptional. 7MHz was in very good shape, with almost 60 countries logged here between 0410 and 0700. HC8DX was a consistently good signal on most bands and was heard on 1·8MHz at 0422 on the Sunday morning. Other notable scalps on that band were ZC4DX, S0RASD, VP9AD, HH2MC, WB8DIT/VP2M, PJ1B and CR9BZ (CT3).

UHF/VHF records

How many times have you wished that you had an accurate record of the squares that you have either heard or worked on the uhf/vhf bands, or that you had a decent record of those squares that you have confirmed?!.

I have now devised a 10-page check list of all the QTH Locator squares, both old and new, in Western Europe (covering the new IM, IN, IO, IP, JM, JN, JO, JP, KM, KN, KO and KP squares), with ample space for callsign, date, mode and propagation mode to be inserted. Copies can be obtained by sending £1 per copy to the address at the foot of this page.

QSL routes

It may be useful for readers to be aware of the DXCC countries which do not have QSL bureau facilities. Accordingly, cards must either be sent direct or to the station's QSL manager. The list is as follows: A5, A6X, A7X, BV, C9, D6, ET, HZ, J5, KC4, KC6, KH1, KH3, KH5, KH7, KH9, KP1, KP5, P5, T2, T3, T5, TJ, TL, TN, TT, TY, TZ, V4, VP2E, VP2M, VR6, XT, XU, XV, XW, XX9, XZ, YA, ZA, ZD7, ZD9, ZK2, ZK3, 3C, 3V, 3X, 3W, 4W, 5A, 5H, 5R, 5U, 5X, 7O, 7O, 8Q, 9G, 9N and 9U.

Special prefixes

I have had a few requests recently to list some of the more widely used special prefixes that appear during the major contests. Here are some of the specials which have appeared in the last year: AZ=LU, BT=BY, CG, CH=VE, CQ, CR, CS=CT, CV, CW=CX, DX, 4DF=DU, EK, EM, EN, EO, ER, EU, EV, EW, EY=UA, FV, HW, TV=F, HD=HC, HJ=HK, L=LU, OF, OG, OI=OH, TE=TI, XQ, 3G3=CE, YR, YQ=YO, YZ, 4N=YU, YW, YX, YY, 4M=YV, ZV, ZX, ZY, ZZ=PY and 4C=XE. There are bound to be even more odd prefixes which are aired for special reasons. This list is not exhaustive, but it is hoped that it will be some help.

Late news

The fine tropo lift which occurred from 4 to 8 November had many reaching for their logs to compare it with other exceptional 144MHz openings; I would draw a comparison with the conditions on 30 July 1981. Details of what was worked will obviously appear in *VHF/UHF*, but it is worth recording that the 4th provided conditions to SP, the 5th to GM, OZ and SM, the 6th and 7th to OK, SP and Y2, with an opening to HB9 drawing a close on the opening in the early hours of the 8th. Several OK3s in JN99 were perhaps the furthest stations logged, but SP3JMZ (JO82) and Y24PL (JO61) produced two new squares on the band.

Finale

Now is the time to remind all swls to submit their end-of-year countries scores for the final 1987 HF Countries Table. Also, news and views for inclusion in the March issue should reach me no later than 15 January, with late copy to be received by 23 January. □

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RAYNET

*Geoff Griffiths, G3STG**

Happy New Year

Since this is the first column of the year, can I take this opportunity to wish all Raynet members and readers the very very best for 1988. I'm sure that this year we will see continuation of the development of amateur radio in general, and in the work of Raynet in particular.

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The Radio Amateurs Emergency Network

It is now some time since I wrote in the column of the general background to the network and attempted to describe the reasons for its existence and what it does, so perhaps these few comments may be of interest to those who are idly scanning through the pages this month.

Raynet is the Radio Amateur organisation which works to provide communications for community service. It was formed following the disastrous East Coast floods in 1953, and has since grown to its present size of just under 5,000 trained and registered members who put their operating experience, as well as their ability to improvise and get stations on the air in the most difficult and unlikely circumstances, at the disposal of the user services specified in the licence.

On any weekend of the year, you might find members providing communications for the St John Ambulance, police or the British Red Cross at a major marathon or fete or show, ensuring that the first-aiders can call for medical assistance quickly when needed. In the event of any large-scale disaster, the training which members carry out with the county emergency planning officers comes to the fore, and there are many instances of radio amateurs providing invaluable assistance during periods of major problems both in the UK and overseas.

Members are organised into local groups based on towns or counties, and they usually meet on-air or face-to-face to train together one or more times a month. There is no national membership subscription, at this time, but most groups ask for some donation towards group expenses from members. Raynet operations take place mainly on fm in the 144MHz band, on frequencies set aside in the band-plan, but there is also regular Raynet traffic on 3·5MHz every Sunday morning at 0830 for the national controllers net on 3,663kHz, as well as activities by individual groups on 70 and 432MHz and elsewhere. Raynet also monitors the world-wide emergency traffic organised by the USA-based International Emergency Network. Indeed, without the co-operation of this organisation, the effectiveness of international communications on such disaster relief operations as Mexico and Columbia would have been severely hampered. Most important is the experience of working as part of a team of fellow members, and mixing enjoyment of your hobby skills with the satisfaction of a public service professionally carried out.

More information can be gleaned from the *Raynet Manual* available from RSGB HQ. If you would like to know more, then contact your local group. They are not far away, if all else fails, a note to me will put you in touch.

Medivac 2 – Exercise Hill-top

On the afternoon of 20 September, there was a great invasion of the Raynet frequencies on the 144MHz band, when "Exercise Hill-top" ran between 1400 and 1700. The plan behind this event ("what plan?", I hear you say) was to demonstrate to groups just how difficult it would be to pass accurate information over long distances when 144MHz was populated by Raynet groups all bent upon doing the same thing. It was also hoped that groups would be able to confirm what paths could be relied upon to give solid communications under these very crowded conditions from their local hill-top sites with the minimum of equipment and power.

In order to try to ensure that all groups reported their findings, a "contest" style log was requested, and I hope that your group is not among those who took part but did not report. Sadly, some members reported that the exercise brought out all the worst operating manners and cavalier attitude to the rules which some contests seem to uncover. In general though, the operation generated the desired traffic density on the Raynet frequencies, and demonstrated the problems likely to be encountered in large-scale disaster relief traffic.

Hurricane

A special Word Of appreciation to all those Raynet members in the South and Southeast, and in South Wales, who worked so hard through all the problems of the "big blow" in October. And especially to those regular users of Susan and the other repeaters who co-operated in their use by Raynet.

It became obvious that the situation posed by massive failures of the public power supply and telephone systems presented both rescue and welfare services and the public utilities with tremendous problems. Much public recognition of Raynet's efforts was received following the events of the weekend, and acknowledgement of the value of the amateur's contribution was made by the HO and the DTI in subsequent meetings.

As always, there are very important lessons to be learned. The delay in mobilising Raynet's services in support of the public utilities and hospital authorities gave much rise for concern, and moves have been taken to try to reduce this in future. But more immediately, the difficulty of calling upon members for the services under these circumstances need re-addressing by many groups.

What arrangements has your group got for monitoring emergency frequencies under emergency conditions? Do they work?

Mulling it over

The peace of the island was once again shattered by the noisy arrival of the contestants in the Shell Mull Rally last October. As I reported in my last column, I had been invited to join the Strathclyde Group at this event, and had been intrigued by the reports of it being an unforgettable experience. It was quite clear that if it was to live up to its reputation the event would have to be rather special. And was it?

Well, frankly, it was. I came away from the island after a five-day stay with much regret, and a great deal of sleep to catch up on. It seemed to me that Ronnie Cowan and the rest of the Strathclyde team have been very fortunate in finding a weekend event which gives so much opportunity for enjoying the best aspects of Raynet operations.

First, the spectacular mountain scenery of the island, snow topped already, presented significant technical challenges in providing communications between the Raynet communications centre, at the Bellochroy Hotel in the small village of Dervaig, and the course HQ at Tobermory on the far side of Mishnish. The further challenge of providing reliable communications to the marshals around the island at places like Craignure, Killichronan and Kilfinichen was considerable, with 3,000ft Ben More doing nothing to help in between. Excellent preparation had ensured that the three in-band and crossband talkthrough units were all prepared but, needless to say, on the day considerable engineering skills were needed to get it all up and running.

The organisation and management demands of the team were pretty gruelling too in an event that lasted from 10.30pm on Friday until 6am on Sunday, with only a few hours for redeployment and servicing of equipment and operators alike. High-speed rallying over single-track roads alongside 400ft drops onto the rocks below, and through special forest stages, requires great concentration from drivers and operators alike. Fortunately the only casualties worthy of note were one or two bent bodies (cars, not people), a rescue Range Rover (it found a stretch of

"I don't care if you are chairman or not. Mull is over that way!"

black ice at 3.30am and emerged with a peaked roof after being manhandled back onto the road by a large team of enthusiastic Raynet volunteers), and a cow. But that is another story!

The Raynet award of the year for the best laugh must go to a competitor who drove straight through the barbecue fire at one of the check points, scattering marshals and Raynet members on his way, or maybe to the lady octogenarian tractor driver who kept a lonely Raynet member regaled through the night with incomprehensible tales of the island, while helping him drink his "first aid" supplies.

But the most lasting impression will probably be the spirit of teamwork and friendliness, as is usual with most Raynet efforts. It was disappointing not to get to Fingal's Cave on Staffa, but the trip to Iona more than made up for it, despite the rain. And the dinner party at the "Puffer Agronnit" was quite an event in its own right! Add to all this the Highland magic, and we definitely will want to return in '88.

Thanks, Ronnie and Kate!

Raynet packet

Many thanks to all those members and groups who have been co-operating with Richard, G8EIA, in setting up a register of Raynet packet capability. I hope that by the time this column appears, we shall have seen the first few in a regular series of Raynet packet trials which will help us to assess how best this powerful communication system can be put to use. Will any Group which has a member active on packet who is not aware of what is afoot, please contact me or Richard for details.

Group reports

Not a great deal of space left this time to share with you some of the many reports from groups which come through my letter box, but I must just take a moment to tell you about an unusual exercise carried out by the Coventry Raynet Group called "Tandem Express".

This involved co-operation between the Raynet groups in Coventry, Oxford, Berkshire, Surrey and Kent to provide communications support to a pair of tandems on a sponsored ride from Coventry to St Etienne and Mairie de Caen, in France, and back. The riders were policemen, nurses and health service workers, and they were given complete safety cover and, at one stage, spare parts for one of the tandems were located and arranged for supply once the teams reached France. The whole operation seems to have gone remarkably smoothly, and was a good example of Raynet members responding to an unusual challenge at short notice. □

SATELLITES

*Bob Phillips, G4IQQ**

THE BEGINNING of another year is upon us once more, and with it the opportunity to make plans to attempt something new in the field of amateur satellite operation. Mode JD on Fuji Oscar 12, or perhaps decoding the whole orbit data from Unsat Oscar 11. Both are, of course, entirely different but each offers its own challenge and reward. The prospect of Phase 3C some time later in the year offers a whole new set of challenges, not least of which will be that of ensuring that all operators have a reasonable chance of accessing the satellite without undue problems.

The various Amsat groups around the world have started to develop plans for the future of the hobby, and hopes are high for some major contributions from Europe, and the UK in particular. More on these developments as soon as the proposals are sufficiently well advanced to have a reasonable chance of success.

Oscar 10

At the time of writing (mid-November) the Oscar 10 controllers were expressing some confidence that the satellite would emerge safely from the prolonged period of poor sun angles towards the end of November. Tests carried out by VK5AGR, ZL1AOX and DB2OS have verified that the battery condition is very good and that the Mode B transponder (435 to 145MHz) is performing well. The date set for a resumption of operations was 16 November, together with the strong plea to exercise great caution when using the satellite. While the sun angle situation is now very good, the satellite will be subject to very long eclipses which occur some time after perigee. The projected operating schedule for the end of December/beginning of January is for the Mode B transponder to be switched on from MA0 to 139 and MA221 to 255. Please check available information sources closer to the time before making use of the satellite.

Phase 3C

This will be the third attempt to place an amateur payload into a stable, highly elliptical orbit. The first failed due to launcher malfunction, and the second (Oscar 10) does not have the correct orbital elements to provide the desired coverage characteristics. The Ariane launch schedule was resumed in October with the successful V18 launch; however, it was made known in early November that problems have arisen in the third stage of one of the next flights and that a delay of some three to six weeks was expected. This will clearly lead to a slip in subsequent launch dates, so it is difficult to say with any certainty when the Ariane 4 carrying the Phase 3C satellite will be launched. Best guess at present is around March/April 1988.

Fuji Oscar 12

After a number of unsuccessful attempts to establish a reliable operating schedule, the latest efforts appear to be holding very well. Indeed, the schedule which was started in mid-October includes plans for the remainder of the year. The schedule for the last week of December and the first week of January is as follows:

Mode	From	To
JD	26 Dec 0324	27 Dec 0432
JD	28 Dec 0338	29 Dec 0243
JD	31 Dec 0257	01 Jan 0404
JD	02 Jan 0311	03 Jan 0217
JA	05 Jan 0230	05 Jan 0136

The transponder will be off at all other times, and the schedule is subject to change at any time in the event of unexpected power situations.

Amsat-UK

There are Amsat groups in many parts of the world, all of which have as their objective the furtherance of amateur satellite activities. One of the foremost of the groups is Amsat-UK which, apart from raising a significant amount of money for the satellite development programme, has provided an excellent information service to users all over the world. All members of the organisation receive a bi-monthly magazine, *Oscar News*, together with the latest information on the active satellites. Software for satellite tracking and telemetry decoding is available for several micros, including the BBC series. G4GPQ has recently completed a suite of programs for the IBM/Amstrad computers which allows predictions to be generated for any earth satellite if either the normal Keplerian elements or the circular orbit EQX data are known. Particularly impressive is the Satscan program which continually checks, in real time, which satellites are in range.

Another service provided by Amsat-UK is to produce the information which appears on the satellite pages of the RSGB area of Micronet. It is possible to go directly to the satellite index by keying *810741O£. The satellite pages contain orbital information relating to the operational satellite including Kepler elements and EQX data.

Further information on Amsat-UK can be obtained from Ron Broadbent, Amsat-UK, London E12 5EQ, enclosing a stamped addressed envelope.

Uosat

A visit to the University of Surrey provided the opportunity to chat with several members of the team about the range of activities covered under the Uosat programme. The amateur radio aspects of Unsat have been described both here and in other publications, but the extent of participation by UK schools is rather less widely known. At present around 1,000 schools take part in a variety of activities concerning the various experiments carried on the satellites. This work provides a much more interesting perspective to some otherwise unattractive classroom subjects. As well as providing many recruits to the hobby of amateur radio, these satellite-based studies are now beginning to bear fruit in students taking degree courses at the university to be followed by careers in related fields.

Now that there is additional research effort available, attention has turned to the Uosat 2 ccd imager. Experience to date has indicated severe difficulties in setting the sensitivity of the device coupled with lack of precise knowledge of the orientation of the spacecraft with respect to earth. It is likely that future Uosat missions will carry similar devices, perhaps with on-board automatic control capabilities to overcome the problems of the first two satellites. □

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DATA COMMS

*Ian Wade, G3NRW**

The Sixth ARRL Networking Conference (continued)

As promised last month, here is a look at some of the software-oriented papers which were presented at the conference. At the most abstract level, there is a useful introduction to Estelle, which is a formal description technique for specifying communication protocols. Estelle takes over where simple state transition tables like those in the AX.25 specification leave off, and allows data flows and interactions to be expressed in Pascal form. Tools like Estelle are being used more and more in communications system design these days, in an attempt to provide concise specifications with the minimum of ambiguity, and should result in more consistent and thorough software implementations.

The Kiss tnc

In a paper by Mike Chepponis, K3MC, and Phil Karn, KA9Q, there are details of the protocols used in the Kiss (Keep it simple, stupid) tnc. This tnc handles only the very basic operations of encapsulating and unwrapping packet frames, and access to the radio link. All the remaining packet processing tasks which are normally handled in a standard tnc now take place in a separate host computer, such as an IBM pc.

The main reason for splitting these tasks between the tnc and the host computer, instead of running them all in the tnc, is that it gives us much more flexibility in experimenting with different protocols. This is particularly useful when implementing higher-level protocols to handle multi-connect bulletin boards, and packages such as TCP/IP (Transmission Control Protocol/Internet Protocol). As a result, the Kiss tnc can indeed be very simple and cheap for low-speed links running at 1,200 or 2,400bps. TCP/IP is being used by an increasing number of stations in the USA and Europe, and will be described in more detail in a future issue.

As an afterthought, don't run away with the idea that your standard tnc may become obsolete now that these new protocols are becoming established. Standard AX.25 tncs will still be around for a long time to come, and things like Kiss and TCP/IP will work alongside them, not replace them. In addition, some standard tncs now incorporate Kiss software as well, so you have the best of both worlds — for example, if you have an AEA PK-232 or PK-87 tnc with up-to-date firmware, you simply invoke Kiss with the commands "Kiss on" and "Kiss off"(!).

"I wanna fix it, is it broke?"

This is the subtitle of an interesting paper on network performance monitoring by Skip Hansen, WB6YMH, and Harold Price, NK6K. They start by emphasising that performance data is vital to the efficient running of a network, particularly now that many different protocols like NET/ROM, TCP/IP and TEXNET are sharing radio links. Each protocol exhibits myriad trade-offs and compromises, and each system has several "tuning knobs" (parameters) which if incorrectly set can have drastic effects on overall network performance.

The problem is that little work has been done on performance measurement, and so it is impossible accurately to gauge the effects of tuning or protocol changes. As an example, the authors cite the change in the AX.25 specification between the original version and the current version (AX.25 L2-V2). The original version did not use the poll/final facility, so that if an acknowledgement of a data frame was not received, the data frame was re-transmitted. If multiple data frames were outstanding, only the first one was re-sent.

In the current version, the poll/final facility is implemented, such that if a data frame is not acknowledged, a "poll" is sent out, soliciting a new acknowledgement. If that acknowledgement does not indicate that the data frame was received, the data frame is re-transmitted, otherwise transmission continues with new data frames.

Any change to a protocol like this entails some cost. Whether it is the effort involved in updating and distributing the new software, or the trek to a snowed-in mountain top to swap roms, some of our limited people resources are expended. The fundamental question is: was the change in poll/final handling worth the effort? Unfortunately there is no data available showing how the network performed before and after the change, so we will never know. More recently, NET/ROM has become widely established, and again we have no before/after data to measure its impact in an objective way.

To quote from the paper, there are two ways of looking at network performance: one is from the network's point of view, and the other is from the user's point of view. In the first case, we are interested in how the channel is performing, how many bytes of data it is carrying. Is the network carrying large amounts of user data, or is most of the capacity going to overhead or retries? Are we losing data to collisions, or to bad rf paths?

On the other hand, the user is perhaps more concerned with the level of service provided by the network. Is the response from distant locations adequate? Do many connections time out? Are some destinations unreachable due to congestion or path failures?

There are several ways of acquiring performance data. One is to have each user's station collect it, but with a population of something like 40,000 tncs in the USA alone this is not a practical proposition. Instead, the authors propose a specialised monitoring station approach, with the monitor station centrally placed to look at all activity on a particular channel. To collect the data, they have developed a monitor package written in Microsoft "C" 4.0. This version runs on an IBM PC-AT, but should easily be transportable to any other micro capable of supporting a similar environment. The pc communicates via an asynchronous RS-232 serial port with a Kiss tnc, which collects the raw frames received on the channel — an ordinary tnc is unsuitable, as it is necessary to be able to decode frames belonging to any protocol, not just AX.25.

The main program in the package monitors the received frames and accumulates data, periodically dumping it to a log file. Addresses, data and control fields (AX.25, NET/ROM and TCP/IP) are displayed. Total numbers of packets and bytes heard from a digipeater are stored, and all packets irrespective of source are counted by length into five buckets; 32, 64, 128, 256 and greater than 256 bytes. For each monitored circuit, statistics are maintained on the number of digipeaters used, the protocol, the total number of packets and bytes received, the number of unique frames heard of each frame type (eg SABM, UA, etc), the number of frames with poll bit set, and the number of frames with the final bit set.

Having collected the data in this fashion, it is then possible to generate several reports, in text and graphics format. These include raw data reports, number of user circuits over a 24h period, bytes/min over a 24h period, and channel efficiency. The software for the monitor package is available from WB6YMH, via his telephone bulletin board (tel 0101 213 541 2503) or via the Hamnet BBS on Compuserve.

Digital transmission of pictures

Still with the conference papers, Thomas Kieselbach, DL2MDE, describes various possible techniques for digital transmission of pictures. Details of the requirements for picture scanning, synchronisation and addressing are included, together with proposals for handling different picture resolutions (128×128, 256×256 and 512×512 pixels).

The main criterion for the sending of individual pictures is the available bandwidth of the transmission channel; for example, a low-resolution 128×128 picture will need more than 35s of transmission time at 4kbps, and a high-resolution picture (512×512) will need around the same time at 65kbps.

Overall transmission times will also depend on the data protocol used. If full arq (automatic repeat request) methods are used, times could be much extended if many retries are needed, whereas broadcast techniques using fec (forward error correction) and data compression will probably make more efficient use of data link capacity. There is still much work to be done in this area.

On a practical front, Thomas then goes on to describe an experimental picture transmission system which has a channel bandwidth of 200kHz, capable of supporting a 64kbps data rate using dpsk techniques. This project is leading to the planned installation of a system on board the next German satellite spacelab mission, where the equipment will comprise a camera, memory for four to eight pictures, and a 435MHz transmitter. In conclusion, Thomas highlights the immediate need for international agreement on digital picture transmission standards, and welcomes any contributions in this area.

Calling all Commodores

Simon Lewis GM4PLM, writes with news of the formation of an amateur radio users group which forms part of the Independent Commodore Product Users Group (ICPUG). The new group will be covering all aspects of computer communications, and already has a section on using Commodore computers for radio applications in the ICPUG magazine. The group is also setting up a public domain software library. For further details contact Simon at 69 Irvine Drive, North Clippens, Linwood, Paisley, Renfrewshire PA3 3TB. □

* 7 Daubeney Close, Harlington, Dunstable, Bedfordshire LU5 6NF.

Report of the City and Guilds of London Institute on the May 1987 RAE

(Reproduced by authority of the Institute)

STATISTICS

OVERALL RESULTS (UK CANDIDATES)

Examination	No of candidates competing exam	Candidates qualifying for RAE certificates No	%
May 1985	4,460	2,987	67·0
Dec 1985	1,980	1,364	68·8
May 1986	3,611	2,374	65·7
Dec 1986	1,338	858	64·1
May 1987	3,017	1,959	64·9

COMPONENT RESULTS FOR THE MAY 1987 EXAMINATION

Paper	Components	No of candidates	Distinction %	Credit %	Pass %	Fail %
·01	Licensing conditions and transmitter interference	2,861	9·4	28·6	33·1	28·9
				71·1%		
·02	Operating procedures practices and theory	2,826	10·0	27·2	40·1	22·7
				77·3%		

REPORTS ON MULTIPLE-CHOICE QUESTION PAPER

PAPER 765·1·01

Syllabus topic or objective	% of items	Comments on performance of candidates
Licensing conditions	57	The performance of candidates with items on licensing conditions was generally very satisfactory. Particularly well answered were the items on the use of the station, shared bands, operators, tests for non-interference and the retransmission of recorded messages. However, less than half the candidates knew what maximum carrier power is permitted on the 144MHz band. An item requiring an understanding of the designation of the classes of emission was very badly answered, less than 20 per cent of candidates selecting the correct answer.
Transmitter interference	43	Only 40 per cent of the candidates answered correctly the item on the choice of frequency measuring equipment for a 144MHz crystal-controlled transmitter. A disappointing number of candidates were able to select the type of filter used to prevent a vhf broadcast receiver receiving breakthrough from a close-proximity 144MHz transmitter. The subject of mains-borne interference continues to be not well understood by the majority of candidates. Seventy-five per cent of all candidates chose the incorrect type of capacitor which would be used in a mains filter.
General comments		Candidates for Paper ·01 were generally well prepared for the examination, although more attention needs to be given to the practical application of preventing transmitter interference. The percentage of candidates successful in the paper was slightly lower than last year.

PAPER 765·1·02

Operating procedures	18	All the items on operating procedures were very well answered by most candidates.
Electrical theory	11	Less than half the candidates knew the relationship between frequency and time, f = 1/T, and could not answer correctly an item which asked the frequency of a sine wave of period 0·05 seconds.
Solidstate devices	13	Many candidates did not appreciate that a tuned circuit in the emitter of a common base rf amplifier is normally tapped because of the transistor having a low input impedance. Only about half the candidates were able to recognise the circuit of an audio frequency push-pull power amplifier.
Receivers	14·5	Most items were answered satisfactorily by most candidates. A disappointing number of candidates did not appreciate that a low intermediate frequency of 85kHz in a double-superheterodyne receiver is chosen to provide high i.f. selectivity; a third of the candidates said that it was to give image rejection. Items involving calculating the frequency of a blo, sidebands, and second channel interference caused difficulty with some candidates.
Transmitters	14·5	Most candidates gave satisfactory answers to items on transmitters. The only item requiring specific mention in this section is the one on the balanced modulator, the function of which was not understood by most candidates.
Propagation and antennas	14·5	The performance of candidates in this section was only fair. There was some misunderstanding about polarisation as applied to a radio wave, and its relation to the direction of the magnetic and electric fields. Many candidates demonstrated a lack of knowledge about selective fading, and the bands on which sky wave propagation is most common. In an item on matching, many candidates did not understand that the turns ratio of a transformer is the square root of the impedance ratio.
Measurements	14·5	Quite well answered by most candidates, but some did not know how to use an absorption wavemeter to check the frequency of a transmitter.
General comments		Paper ·02 was generally well attempted, candidates being satisfactorily prepared. Some of the items causing difficulty related to practical applications. Seventy-seven point three per cent of all candidates who took the paper were successful.

Mid-Thames Triple Night DF Event results

Eighteen teams assembled on a very clear and dry October evening for the start of the event organised by Chris Plummer, G8APB. This competition always provides a fitting end to the df season, and certainly lived up to its reputation of being the toughest of the year!

Good signals were heard from all three of the newly-constructed club transmitters, with only a few competitors requiring approximate bearings. The transmitters were placed to test navigational skills rather than to encourage a road race.

Station A, G4MDF/P, operated by Chris Plummer and Alan Stables, was fiendishly placed, one mile NE of the start, on a marshy islet at the westerly end of Frensham Little pond only 15ft from the shore but separated by water up to 8ft deep. There were shallower bits, but it required considerable courage to find them in pitch darkness; even when convinced of the necessity to cross the water, some teams hesitated for a considerable time. Due to the close proximity of the station to the start, the transmitter crew tailored the radiated power accordingly and were rewarded with reports of teams starting the search 15 miles away beyond Guildford.

Station B, G3TRY/P, operated by Roy Powers and Matthew Plummer, was located 10 miles NNW of the start, nesting 10ft off the ground in the remains of a large number of fallen and well tangled beech and oak trees on the north side of the M3 at Rotten Green near the Fleet service area. Chosen before the recent hurricane force winds, the site was considerably improved by the tangle of debris, and many tunnels were forced through the undergrowth by competitors – even one beneath the nether regions of the crew. Although only 100 yards from the road, it proved to be 100 yards of hell!

Station C, G4MDC/P, operated by Min Standen and Graham Taylor, was located seven miles west of the start, dug into the bank of a stream with the antenna following the course of the swift flowing stream and under the national grid power lines. Walking along the length of the antenna didn't help find the transmitter and re-radiation from the power wires provided by Ann Plummer, who also provided facilities for damp(?) competitors to dry out. Brian Bristow, G4KBB, was awarded the Treble Night Trophy, his team being the only one to find all transmitters.

Consideration is now being given to the possibility of running two competitions simultaneously, one for older more mature competitors and another, more difficult one, for those still young and enthusiastic types. However, as one contestant observed, it was a competition which sorted the men from the boys!

Posn	Name	Club	Time of arrival Stn A	Stn B	Stn C
1	B Bristow	Mid-Thames	2216	2055	2320
2	P Lisle	Mid-Thames	2310	2135	–
3	D Holland	S Manchester	–	2327	2130
4	B Poole	Mid-Thames	–	2136	2328
5	C Wells	S Manchester	2144	–	2329
6	M Hawkins	Chelmsford	–	2129	2338
7	G Whenham	Coventry	2351	2205	–
8	A Coffett	Dartford Heath	2356	2220	–
9	A Simmons	Mid-Thames	–	2300	2357
10	T Gage	Mid-Thames	2144	–	–
11	M Ellis	S Manchester	2216	–	–
12	R Witney	Colchester	–	–	2233
13	I Butson	Colchester	–	2305	–
14	D Newman	Northampton	–	2310	–
15	J Drakeley	Slade	–	–	2330

Three competitors failed to find any station.

Contest News

General rules for RSGB vhf/uhf/shf contests 1988

The rules governing all RSGB vhf/uhf/shf contests held in 1988 will include the following general rules, supplemented by individual rules for each contest. **Please read the rules carefully before the event.**

Cover sheets (Form 427·86), summary sheets (Form 4422), and small quantities of log sheets (Form LSVHF) are available from RSGB HQ on receipt of a large sae. Large quantities of log sheets may be obtained from RSGB Publications (Sales).

Queries on vhf contests may be made to John Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich, Suffolk IP5 7ED; Tel Ipswich 717830 (between 6pm and 9pm).

The individual contest rules contain most of the detailed information on the sections, scoring systems and methods of tabulation. Unless otherwise stated in the individual contest rules, all of the general rules apply in every contest.

Please note that, as last year, all points claimed for a contact will be lost if either station logs callsigns incorrectly, including any suffix. The receiving station will also lose all claimed points for a contact where other information is logged incorrectly. Ten times the claimed score will be lost for unmarked duplicate contacts.

Please do not send entries by Recorded Delivery or Registered Post, as this may delay receipt. Include a stamped addressed postcard if you want confirmation of receipt.

Rules that have changed are marked by an asterisk.

1. Entries
All entries must be sent to the contest adjudicator at the address shown in the individual contest rules. All entries become the property of the RSGB and cannot be returned.

2. Last posting date*
All entries must be postmarked not later than 14 days after the end of the contest or last cumulative activity period.

3. Cover sheets
All entries must be accompanied by a correctly completed current RSGB vhf/uhf contest cover sheet (Form 427·86) for each band used, including full details of antennas and final amplifier devices. In multiband events entrants must also complete a multiband summary sheet (Form 4422).

4. Operators
All operators must be RSGB members.

5. Single-operator fixed stations*
Single-operator fixed stations are those operated by the licensee in person from his/her normal place of residence, with no assistance with operating or log keeping during the contest.

6. Fixed stations*
To be eligible to enter a fixed station section the station must be located at the main address shown on the licence.

7. Locations
In multiband events all stations forming one entry must operate from one site, defined as a circle of 1km radius.

All equipment for portable stations must be installed on site during the 24 hours before the contest or during the contest itself. Entrants may not change the location of their stations during the contest.

Valid contacts*
No points will be lost if a non-competing station contacted by an entrant is unable to supply a QTH, locator, or serial number, but the receiving operator must obtain and record enough information to be able to calculate the claimed distance score. Contacts with stations whose callsigns appear on the cover sheets will not count for points.

Only one scoring contact may be made with a given station on each band in use during the contest, ie any callsign regardless of suffix or prefix may only be worked for points once. Any non-scoring contacts must be clearly marked in the log. Unmarked duplicate contacts will be penalised at the rate of 10 times the claimed score for that contest.

In cumulative contests one contact may be made with a given station (as detailed above) during each activity period. The adjudicator will normalise the scores in each session (see rule 10), and each entrant's best three scores will be combined to determine the overall placing. Entrants should submit logs for every session for which they are active.

9. Radial ring scoring*
Contacts made between stations separated by the distances shown in the table will score as indicated.

Km	Points	Km	Points
0–50	1	151–200	7
51–100	3	201–250	9
101–150	5	251–300	11

and pro rata. For computer scoring purposes a conversion factor of 111·2 km/degree must be used.

10. Final tabulation of multiband and cumulative contests*
The final tabulation showing the overall results will be formed by taking the sum of the normalised scores on each band or from the three best sessions in cumulative contests. The normalised score will be calculated by dividing each station's points score by that of the band/session leader and multiplying by 1,000.

$$\text{ie Normalised score for each band/session} = \frac{\text{Score achieved}}{\text{Band/session leaders score}} \times 1{,}000$$

11. Awards*
There will be an award to the highest station in each section. An award will also be made to the runner-up in each section in which there are 10 or more entries. Certificates of merit may be awarded at the adjudicator's discretion.

12. Crossband contacts
Crossband contacts do not count for points.

13. Log Keeping*
The logs for contest entries must be made out on current RSGB vhf/uhf log sheets or, if computer listings are to be submitted, these must be cut to A4 size, RSGB log format, equally spaced to contain 25 contacts per sheet, and be correctly collated (not Z-fold). Each sheet must be headed with the entrants callsign, IARU locator, contest title and sheet number. The total points claimed on each sheet must be included at the foot of the sheet. Logs must be tabulated as follows:
(i) Date/time (GMt)
(ii) Callsign of station worked
(iii) My report on his/her signal and serial number
(iv) His/her report on my signal and serial number
(v) IARU locator received
(vi) QTH or county received (when required) or comments
(vii) Points claimed

The contest exchange must consist of both callsigns, RS or RST report followed by serial number and IARU locator. Where QTH information must be exchanged it must be given as a point identifiable on an Ordnance Survey route planning map (scale 1:625,000) or as a distance and direction not greater than 25km from such a point. Any complaints received or made about signals must be recorded in the comments column.

14. County multipliers*
In contests using a county multiplier scheme the contest exchange will include the full county name or the code letter shown in this operating guide. The score obtained under rule 9 will be multiplied by the total number of counties and countries worked. Where more than one station is worked in a particular Scottish region, additional multipliers can be claimed for each contact, up to a maximum of three multipliers per region. Each new multiplier must be clearly marked in the log and listed with the contact serial number on a separate multiplier check list. Please note that a contact with your own county and country count as multipliers, and that a contact with a station in another G prefix area can count for both a county and a country multiplier.

15. Serial numbers
Serial numbers start from 001 on each band and advance by one for each contact. In cumulative contests serial numbers increment from 001 for each activity period.

16. A station must operate from within the terms of his/her normal licence. (This excludes high power permits). Special event callsigns may not be used.

17. The same antenna system must be used on transmit and receive.

18. Stations using telephony in the recognised low sub-bands are liable to disqualification. Entrants must observe the provisions of the IARU/RSGB band plans. Bands other than those included in the contest cannot be used simultaneously by a separate station for setting up contacts or talkback.

19. Stations which persistently radiate poor-quality signals, or otherwise contravene the code of practice for vhf/uhf contest operation (see below), are liable to disqualification or loss of points. Gross errors in logging will result in disqualification.

20. Contacts made via a repeater, man-made satellite, or moonbounce will not count for points.

21. Proof of contact may be required.

22.* Entrants must permit inspection of their station by members of the VHF Contests Committee, or its representatives, and give site access information if required to do so. The inspector must be permitted to remain for as long as desired, and to return to the site at any time during the contest. Contestants must demonstrate to the inspector's satisfaction that they are obeying the rules of the contest, and must be able to demonstrate that they are operating within power limits.

23. The ruling of the Council of the RSGB shall be final in all cases of dispute.

General rules for RSGB listeners vhf/uhf contests 1988

1. The 1986 general rules for vhf/uhf contests will apply except where modified by these rules.

2. Listeners contests are open to all non-licensed members of the RSGB. Only the entrant may operate the receiving station.

3. Logs must show in columns: **(a)** date/time (gmt), **(b)** Callsign of station heard, **(c)** my report on his/her signals, **(d)** report and serial number sent by station heard, **(e)** callsign of station being worked, **(f)** IARU locator given by station heard, **(g)** QTH given by station heard (if appropriate), **(h)** points claimed.

On 144MHz the callsign in column **(e)** may only occur in every 10 contacts logged. CQ and test calls do not count for points and should not be logged. If both sides of a QSO can be heard, both can be claimed for points.

The Hansen Trophy will be awarded to the entrant with the highest aggregate score in all the swl contests between 5 March and 18 September 1988. The aggregate score will be calculated in accordance with general rule 10.

Code of practice of vhf/uhf contest operation

1. Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.

2. Take all possible steps to ensure that a site is not going to be used by some other group or club. Check with the club and last year's results table to see if any group used the site last year. If it is going to be used by another group, come to an amicable agreement before the event. Groups are advised to select possible alternative sites.

3. All transmitters generate unwanted signals; it is the level of these signals that matter. In operation from a good site, levels of spurious radiation which may be accepted from a home station may well be found to be excessive by nearby stations (25 miles away or more).

4. Similarly, all receivers are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality. Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.

5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur band spurious radiations, including noise modulation, to a level of −90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.

6. Above all, be gentlemanly at all times. Be helpful and inform stations apparently radiating unwanted signals at troublesome levels – having first checked your own receiver! Try the effect of turning the antenna or inserting attenuators in the feedline; if the level of the spurious signal changes relative to the wanted signal then non-linear effects are occuring in the receiver. Some recent synthesised equipment has excessive local oscillator phase noise, which will manifest itself as an apparent splatter on strong signals, even if there is no overloading of the receiver front-end. Preamplifiers should always be switched out to avoid overload problems when checking transmissions. If you receive a complaint, perform tests to check for receiver overload, and try reducing drive levels and switching out linear amplifiers to determine a cure. Monitor your own signal "off air" if possible. Remember that many "linears" may not be linear at high power levels under field conditions with poorly regulated power supplies. The effects of overdriving will be more severe if speech processing is used, so pay particular attention to drive level adjustment.

If asked to close down by a Government official or the site owner, do so at once without objectionable behaviour.

General Rules for RSGB HF Contests 1988

The general rules for RSGB hf contests are given below. These should be read in conjunction with the specific rules for each particular contest which may contain exceptions or additions to these general rules. For the benefit of overseas entrants, RSGB international contest rules are framed to comply with agreed IARU Region 1 guidelines and rules for individual events include the relevant sections of the general rules. **It is important to note that the general rules for 1988 contain a number of additions and amendments from those published in previous years.**

1. Conditions of entry

(a) Each entrant agrees to be bound by the provisions, as well as the intent of these general rules and the specific rules published for each contest.

(b) Entrants must operate in accordance with the terms of their licence.

(c) Entrants may only use one callsign during the duration of a contest.

(d) Entrants must operate from a single location during a contest. This rule applies to all contests, including field-day events and those that are run in separate sessions (eg low-power and accumulative contests).

(e) All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

(f) Entrants may be disqualified for failure to observe the general rules or the specific contest rules.

(g) Data Protection Act. UK entrants should note that members of the HF Contests Committee who are adjudicating contests may use personal computers to process contest information which is derived from entrants' logs. Such information may include the entrant's callsign, claimed score and details of the contacts listed in that entry. Such information is required as a check for duplicate contacts, to tabulate results or list other data. Such data will only be held on a temporary file during the adjudication process and for a limited period thereafter before being erased. If any UK entrant objects to this, they must clearly state their objection on the cover sheet of the entry so that the information can be hand-processed.

2. Classes of entrant

(a) Unless otherwise stated in specific contest rules, only single-operator entries will be accepted. A single-operator station is one manned by an individual operator **who receives no assistance whatsoever during the contact period.**

(b) For certain contests, multi-operator entries are permitted. Such entries will be accepted subject to the contest declaration form (see below) being signed by one operator, who becomes the entrant and is responsible for the entry. The entrant is required to ensure that the operator's callsign is shown on the log for the entry for each contact, or group of contacts, made by that operator and that the contest rules have been observed. Failure to observe these requirements will result in the entry being disallowed. **Note:** The AFS Team Contest is a special case where the entrant is a society affiliated to the RSGB and the person responsible for the entry is a designated official of the affiliated society. Apart from this change, the applicable general rules apply to this event.

(c) For the purposes of entries, the UK is defined as being within the call areas G, GD, GI, GJ, GM, GU and GW. Contest entrants within these call areas must be fully-paid-up members of the RSGB.

(d) In certain contests, as defined in the specific rules, there is a seperate section for "first time" entrants. A "first time" entrant is one who has not previously entered any RSGB hf contest.

(a) Entrants in field day events may not operate from any permanent building or structure, or use power from a public mains supply. Power may only be derived from a portable generator driven by a motor, wind or manpower on the site, or from solar cells, accumulators or batteries.

(f) Entries from stations using the GB prefix, aeronautical mobile and maritime mobile stations will not be accepted.

(g) It should be noted that special event callsigns GB5CC, GB5HO and GB6HQ are allocated for use by the HF Contests Committee, and stations using these callsigns may be active during RSGB hf contests. As defined in the individual contest rules, contacts made with these stations may earn an additional bonus or points.

3. Contacts

(a) For each contest only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. In an accumulative type contest, each session will be regarded as a seperate contest.

(b) A contact consists of an exchange and an acknowledgement of an RST report on telegraphy or a RS report on telephony and normally a three-figure serial number commencing with 001 increasing by one for each successive contact irrespective of the band in use. Serial numbers, when sent, must be recorded from non-competing stations. Certain contests require a different form of exchange and this is specified in the individual contest rules. In an accumulative type contest, each session will recommence with 001.

(c) The practice of pre-arranging contest contacts with specific stations before the start of the event is not allowed. Assistance from non-competing stations and the use of spotting nets etc for bonus/multiplier hunting is specifically prohibited. **Any violation of this rule will result in automatic disqualification.**

4. Frequencies

(a) The RSGB supports the IARU Region 1 policy relating to the provision of contest-preferred frequency segments. Contestants must transmit only within the frequencies designated in the rules for each event. This does not prevent an entrant from contacting a station on another frequency segment on the same band. For example, on 7MHz it is permitted for Region 1 stations transmitting on a designated contest frequency below 7,100kHz to contact stations in other regions who are operating between 7,100 and 7,300kHz. This also applies to contacts made on the 1·8MHz band.

(b) Entrants who fail to keep within the specified contest frequencies as defined in the rules for individual contests will be disqualified.

(c) Cross-band contacts, other than those specified in **(a)** above, are specifically prohibited.

5. Scoring

(a) Each contact will be scored as per the rules for the particular contest.

(b) For scoring purposes, aeronautical mobile and marine mobile stations will count only as the minimum score of the particular contest and not for any bonus or multiplier.

(c) Points will be deducted for errors in the entrant's log. Reductions will be made for incorrect log entries of any kind, unconfirmed contacts, bonus/multipliers or other scoring discrepancies. An entry will be disqualified if the overall score is reduced by more than 10 per cent as a result of such errors. This penalty will not be applied in regard to unmarked duplicate contacts which are penalised as specified in (d), or for arithmetical errors.

(d) Duplicate contacts must be logged and clearly marked as duplicates without claim for points, bonus or multiplier. Unmarked duplicate contacts will be penalised at the rate of 10 times the claimed score (points/bonus) for the contact plus the original points claimed. Entries containing more than five such unmarked duplicate contacts will be disqualified.

(e) Proof of contact may be required.

6. Disqualifications

(a) If a participant is disqualified for reasons stated in these general rules, that operator may be debarred from entering the same contest the following year.

(b) If a participant is disqualified for a breach of rules in more than one contest during a 12-month period, that operator may be debarred from entering any RSGB contest, either as a single-operator entrant, or as an operator in a multi-operator entry, for a minimum period of 24 months.

(c) The callsigns of disqualified or debarred competitors will be published in the contest report.

7. Entry procedure

(a) Each entry consists of a contest log (see below), a cover/summary sheet (eg Form HFC2) incorporating a signed declaration. In contests where the entrant has made 80 or more contacts, separate callsign lists are required showing the stations worked on each band. Entries that do not include the declaration and the lists of stations worked (where applicable) will not be classified and will be treated as checklogs.

(b) Logs must clearly be written or typed on one side only of RSGB hf contest log sheets (Form HFC1), or on international A4-sized paper using blue or black ink. Seperate log sheets must be used for each band. Logs must be kept and entries submitted in ute (gmt). Any log that is incomplete or illegible will not be accepted as an entry.

(c) Logs will only be accepted provided they are formatted to correspond with Form HFC1, viz, 40 entries per full A4-sized page split into groups of 10 contacts and having the same column spacings and headings. Logs that differ from this format will not be adjudicated.

(d) Entries must be addressed to the adjudicator, whose address will appear in the specific rules for each contest, with the name of the contest marked in the top left-hand corner of the envelope or package. Entries addressed to RSGB Headquarters or to an incorrect adjudicator are likely to be delayed and often arrive too late to be included as an entry.

Code letters for use in RSGB contests

County/Region	Letters	County/Region	Letters
Alderney	ALD	Isles of Scilly	IOS
Antrim	ATM	Isle of Wight	IOW
Armagh	ARM	Jersey	JER
Avon	AVN	Kent	KNT
Bedfordshire	BFD	Lancshire	LNH
Berkshire	BRK	Leicestershire	LEC
Borders	BDS	Lincolnshire	LCN
Buckinghamshire	BKS	Greater London	LDN
Cambridgeshire	CBE	Londonderry	LDR
Central	CTR	Lothian	LTH
Cheshire	CHS	Greater Manchester	MCH
Cleveland	CVE	Merseyside	MSY
Clwyd	CWD	Norfolk	NOR
Cornwall	CNL	Northamptonshire	NHM
Cumbria	CBA	Northumberland	NLD
Derbyshire	DYS	Nottinghamshire	NOT
Devon	DVN	Orkney	OKE
Dorset	DOR	Oxfordshire	OFE
Down	DWN	Powys	PWS
Dumfries & Galloway	DGL	Shropshire	SPE
Durham	DHM	Sark	SRK
Dyfed	DFD	Shetland	SLD
Essex	ESX	Somerset	SOM
Fermagh	FMH	Staffordshire	SFD
Fife	FFE	Strathclyde	SCD
Mid Glamorgan	GNM	Suffolk	SFK
South Glamorgan	GNS	Surrey	SRY
West Glamorgan	GNW	East Sussex	SXE
Gloucestershire	GLR	West Sussex	SCW
Grampian	GRN	Tayside	TYS
Guernsey	GUR	Tyne & Wear	TWR
Gwent	GWT	Tyrone	TYR
Gwynedd	GDD	Warwickshire	WKS
Hampshire	HPH	Western Isles	WIL
Hereford & Worcester	HWR	West Midlands	WMD
Hertfordshire	HFD	Wiltshire	WLT
Highlands	HLD	North Yorkshire	YSN
Humbarside	HBS	South Yorkshire	YSS
Isle of Man	IOM	West Yorkshire	YSW

(e) The dates for submitting entries are specified in the individual rules (usually 15 days following the date of the contest). Logs postmarked after the specified date will be treated as checklogs.
(f) If acknowledgement of receipt is required, UK entrants should include a stamped addressed postcard which will be returned to the sender. Overseas entries will not normally be acknowledged.
(g) Small quantities of RSGB log sheets (Form HFC1) and/or cover sheets (Form HFC2) may be obtained from RSGB Headquarters on receipt of a large stamped addressed envelope. Large quantities may be purchased. **Note: Contest adjudicators do not keep supplies of these forms.**
8. Awards
(a) Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates of merit. The awards for a particular contest are defined in the individual rules.
(b) All trophies must be returned to RSGB Headquarters on or before the date specified by the trophies manager. Trophies must be returned **in their transit boxes, wrapped securely and fully insured to the value of the trophy.** All documentation must be retained by the sender as proof of posting.
(c) Certificates of merit are made at the discretion of the HF Contests Committee and are normally awarded to the leading three entrants in an event. Additional certificates to section winners and others who have made a significant contribution to the success of the event, will be awarded as applicable.

GENERAL RULES FOR RSGB HF RECEIVING CONTESTS 1988

The general rules broadly follow those for transmitting contests and should be read in conjunction with these and with the individual rules for each contest where an swl section is included. Particular attention is drawn to the following general rules: 1(a), 1(d), 1(e), 1(f), 1(g), 2(a), 2(c), 5(a), 5(b), 5(c), 5(d), 6(a), 6(b), 7(a), 7(b), 7(c), 7(d), 7(e), 7(l), 7(g), 8(a), 8(b), 8(c).

In addition, a receiving station log must show in columns: date/time (gmt), callsign of station heard, report and serial number sent by station heard, callsign of station being worked, bonus points, total points. The band in use must be shown at the top of each log sheet.

A cover/summary sheet (eg Form HFC2) must be submitted with the logs. The signed declaration must include the words, "I certify that I do not hold a Class A transmitting licence."

70MHz Cumulative Contest rules

1000–1200gmt 31 January; 14, 28 February; 13 March; 0900–1100gmt 27 March 1988

The general rules published in the "Contest News", *Rad Com* January 1988, will apply. There will be two sections, Section F for single-operator fixed stations and Section O for all others. QTH information must be exchanged.

All entries and check logs to: VHF Contests Committee, c/o D J Robinson G4FRE, 15 Ferry Lane, Cavendish Park, Felixstowe, Suffolk IP11 8UR.

144MHz CW Contest Rules

0900-1500gmt, 7 February 1988

The general rules published in the "Contest News", *Rad Com* January 1988, will apply. Entrants may transmit only A1A (cw) or F1A (fsk) and contact only other stations transmitting these modes. There will be two sections, Section F for single-operator fixed stations, and Section O for all others.

All entries and check logs to: VHF Contests Committee, c/o G M C Stone G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

432MHz Fixed Station and Affiliated Societies and SWL Contest rules

The AFS inter-club competition is being continued this year. The rules are similar to last year's with three stations per team. The contest will continue to be open to individual entries, both single and multi-operator, as before. Individual station scores and overall team results will be separately tabulated, and certificates will be awarded to the leading stations and team in each RSGB Zone. This year there is a section for SWL entries.

1. Date. 21 February 1988
2. Time. 0900–1500gmt
3. Teams. A society entering one team will have its placing determined by the aggregate scores of the three highest scoring stations in their team. A society may enter more than one team, in which case the aggregate scores of the three highest scoring stations will be placed in team "A", the next three highest scoring stations in team "B" etc.
4. Eligible entrants. Operators entering on behalf of an affiliated society must be members of that society, but need not be a member of the RSGB. Other individual entrants must be RSGB members. All stations representing a society must be operated within 50km of the normal society meeting place. No station may represent more than one society. In the case of a society with national coverage, eg RNARS, each team may define a different society meeting place, but this should be a place of recognised significance, eg a naval base. For all purposes other than the indication of affiliation, each such entry shall be regarded as entirely separate. No operator shall use more than one callsign during the contest period.
5. Sections. There will be separate single- and multi-operator sections for tabulating station scores. A team may consist of both single- and multi-operator stations. There will also be a section for listeners.
6. Entries. Each individual entry shall conform to the general rules. Each log must be accompanied by a 427-86 cover sheet, and must show the RSGB zone that the station operated from. RSGB zones are defined on page 899 of the December 1987 issue of *Radio Communication*. All entries from one society are to be sent in one package to the adjudicator. Packages underpaid and bearing postage due stamps will be returned to the sender. Each package must include a declaration signed by an officer of the society that each entrant is a member of that society, and the normal meeting place address must be given. A note stating the number of teams representing the society, and their scores, should be included.
7. Awards. Certificates will be awarded to the following:
The leading single-operator fixed station in each RSGB zone.
The leading multi-operator fixed station in each RSGB zone.
The leading affiliated society team in each RSGB zone.
The leading listener entry.
8. General rules. The following general rules, published in the "Contest News", *Rad Com* January 1988, will apply: 1,2,3,5,6,8,9,12,13,15–23.
9. Adjudicator. All entries and check logs to: VHF Contests Committee, c/o J H Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrews, Ipswich IP5 7ED.
NB. Although the contest includes an inter-club element, entries from individual single- or multi-operator fixed stations are encouraged.

144MHz & SWL Contest rules

1400–1400gmt, 9–10 April 1988

The general rules published in the "Contest News", *Rad Com* January 1988, will apply. There will be three sections, Section S for single-operator stations, Section M for multi-operator stations, and Section L for listeners. County and country multipliers will be used (general rule 14).

All entries and checklogs to: VHF Contests Committee, c/o D A Yorke, G4JLG, 40 Edge Fold Road, Worsley, Manchester M28 4QF.

144/432MHz & SWL Contest rules

1400–1400gmt, 5-6 March 1988

The general rules published in the "Contest News", *Rad Com* January 1988, will apply. There will be three sections, Section S for single-operator stations, Section M for multi-operator stations, and Section L for listener entries. Single-band entries for 144MHz only will not be accepted. Single-operator entrants must use the same callsign on both bands.

All entries and check logs to: VHF Contests Committee, c/o D J C Bushell, G4WAD, Tanglewood, Bridge Street, Lower Moor, Pershore, Worcs.

50MHz Fixed Station Contest rules

1800–1800gmt, 2 April 1988

The general rules published in the "Contest News", *Rad Com* January 1988, will apply. There will be two sections, Section F for single-operator fixed stations, and Section O for all other fixed stations. County and country multipliers will be used (general rule 14). In view of comments received on scoring systems on 50MHz, radial ring scoring will be used for all contacts up to 650km, and all contacts over this distance will score 25 points each.

All entries and checklogs to: VHF Contests Committee, c/o A J Collett, G4NBS, 10 Quince Road, The Limes, Hardwick, Cambridge CB3 7XJ.

70MHz Fixed Station Contest rules

0900–1400gmt, 3 April 1988

The general rules published in the "Contest News", *Rad Com* January 1988, will apply. There will be two sections, Section F for single-operator fixed stations, and Section Q for all other fixed stations. County and country multipliers will be used (general rule 14).

All entries and checklogs to: VHF Contests Committee, c/o J Pilags, G8HHI, 43 Bartons Drive, Yateley, Camberley, Surrey GU17 7DW.

10GHz Cumulative Contest rules

0900–2100gmt, 17 April, 15 May, 19 June, 10 July, 7 August, 11 September

Except where modified below, all the general rules for vhf/uhf/shf contests contained in 'Contest News", *Rad Com* January 1988, apply.

Entrants unable to be active for three periods are strongly encouraged to send in their logs as a record of their activity, but will not be eligible for an award. Such logs will be recorded in the results.

Entries from outside the UK will be accepted, whether or not they are RSGB members.

Stations operating from within the UK must state in their logs the national grid reference of all sites used.

There will be three sections, wideband, narrowband and fast-scan tv, which will be scored separately. Stations may operate in all sections if they wish. A given station may be contacted thrice, once on each mode. In the case of crossmode contacts, the contact should be included in the section appropriate to the equipment used at your end. Serial numbers start at 001 and advance by one for each contact, irrespective of section. A certificate will be awarded to the winner, runner-up, leading foreign station and fixed station in the narrow and wideband sections, and to the leading station in the tv section. In addition, the station submitting the highest scoring entry will receive the Alpha award.

During each activity period, a station may change its location once. For the purpose of this contest the "location' is defined as any point within a 5km radius of a fixed point. Contestants may start from a new location for each activity period.

Contacts will be scored at one point per kilometre. Half-points may be claimed by both stations for a crossband contact if two-way communication cannot be established on the same band. A full contest exchange should be given on both bands. All crossband contacts must be clearly marked as such in the respective logs.

Entries should be postmarked no later than 26 September 1988. Please do not send in logs until after the last event. All entries and checklogs to: The VHF Contests Committee, c/o D J Robinson, G4FRE, 15 Ferry Lane, Cavendish Park, Felixstowe, Suffolk IP11 8UR.

Ropoco 1 Contest rules

1. The general rules for RSGB hf contests published in "Contest News" *Rad Com* January 1988 will apply.
2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles holding a Class A licence. Single-operator entries only.
3. When. 0800-1000gmt 3 April 1988.
4. Contacts. CW on the 3-5MHz band only. Entrants are requested to confine their operations to the IARU Region 1 contest preferred segment – 3,510–3,550kHz. Send RST for the first contact plus the entrant's own postal code. For the second and subsequent contacts the postal code received in the previous contact should be sent. Contacts with stations outside the British Isles will not count for points.
5. Scoring. 10 points per contact.

6. Entries. Logs must be sent to J Allaway, 10 Knightlow Rd, Birmingham B17 8QB, postmarked no later than Monday 18 April 1988.
7. Awards. Certificates will be despatched to the first, second and third placed entrants.

IARU/RSGB 432MHz – 24GHz Contest results

This contest was once again enjoyed by all contestants, although the conditions were not as good as last year! Conditions were reported to be slightly down from average; but there was some dx worked. Logging standards were down from previous years, with most contestants losing points, mainly for incorrect reports and locators.

It was disappointing to see the lack of activity on the higher bands. This may have been due to conditions rather than lack of trying, as some stations were equipped for them but were unable to make any contacts. All the logs will be forwarded to the IARU adjudicator for entry into that contest, and the results will be published in 1988.

Congratulations and thanks to all stations for participating. Certificates will be awarded to the winners and runners-up where appropriate. *GM8MJV*

OVERALL RESULTS TABLE

Multi-operator

Posn	Group	Points	Band positions 432	1·2	2·3	3·4	5·6	10	24
1	Hadlabs & Tarts C.G	6,599	4	2	1	1	1	1	1
2	Parallel Lines C.G.	3,754	1	1	2	2	–	–	–
3	Sheppey Western C.G.	2,187	2	3	4	–	–	–	–
4	Marlesham & Bracknell CG	1,838	3	4	5	–	–	–	–
5	South Birmingham R.S.	926	6	3	–	–	–	–	–
6	Exmoor Radio Club	921	7	5	–	–	–	–	–
7	South Manchester R.C.	744	8	7	–	–	–	–	–
8	Fareham & District ARC	735	9	8	6	–	–	–	–

Single-operator

Posn	Callsign	Points	Band positions 432	1·2	2·3	3·4	5·6	10	24
1	G6DER	3,296	4	2	1	1	–	–	–
2	G4PMK	1,539	9	1	2	2	–	–	–
3	G1KDF	1,035	6	3	–	–	–	–	–
4	G8ZOB	939	10	4	3	–	–	–	–

432MHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G4CLA/P	91,381	297	O3CE	400	8x21el	HB9AEN/P	835
2	G8ROU/P	71,452	205	70XQ	400	4X19el	–	–
3	G4MRS/P	70,582	252	01OX	300	8Xyegis	HB9AEN/P	681
4	G4PUB/P	57,434	238	01OI	25	4X21el	EI5FK	686
5	G8ZHP	45,971	171	G2TR	400	8x21el	DJ6CK	664
6	G4HRY/P	40,774	223	92HD	250	2x21el	DK0JK/P	689
7	G4HGU/P	37,692	154	81CC	–	4x28el	PI4EME	714
8	G3FVA/P	34,636	152	93BF	150	4x23el	DL2NO	691
9	G4ITF/P	12,494	79	90MX	100	17el	G1GEY	441

432MHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G8IAT	21,939	120	91TV	100	2x21el	DK0VS/P	585
2	G1LSB	18,172	76	02CT	80	21el	DL8PC	565
3	G6YLS	8,886	56	01HT	100	17el	DL0UKW 60	493
4	G8DER	8,189	30	93GN	60	21el	DL2KBB	600
5	G6GEY	7,759	30	94FW	100	2x17el	F6CTT/P	617
6	G1KDF	7,565	40	83NN	100	21el	F6HPP/P	639
7	G4FOH	6,749	29	92XI	8	21el	DK0VKG/P	477
8	G6CSY/P	5,645	38	01BH	50	19el	GW3KJW	370
9	G4PMK	5,524	26	93GT	60	19el	F6CTT/P	492
10	G8ZOB	3,893	22	92JN	30	19el	ON1BLY/A	383
11	G8JXV	3,401	32	91VE	100	48el	G8ROU/P	275

SWL SECTION

Posn	Station	Points	QSOs	Loc	Ant	Best dx	Km
1	BRS28198	3,760	22		44el	G8ROU/P	325
2	BRS31978	1,973	17		9el	G8ROU/P	340

Check log: G4NBS

1,296MHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G4LIP/P	23,358	92	03CE	400	16x23el	DA1UM	549
2	G0ALE/P	22,691	106	01OI	400	2m Dish	GI4OPH	581
3	G4FRE/P	22,675	69	70XO	200	2m Dish	DL4EA/P	777
4	G4ODN/P	15,391	66	01QX	60	1.8m Dish	DC8UG	479
5	G4JKN/P	11,898	43	81CC		3m Dish	DF0HS/P	568
6	G8OHM/P	10,520	71	92GB	100	2x23el		
7	G3UHF/P	8,536	50	93BF	80	2m Dish	DK0VKG/P	753
8	G8VOI/P	7,898	45	90MX	35	3m Dish	F1GTR/P	423

1,296MHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G4PMK	3,465	21	93GT	50	23el	DK0VKG/P	624
2	G6DER	3,198	17	93GN	100	1·4m Dish	PE1ALA	433
3	G1KDF	2,741	20	83NN	20	4x23el	–	–
4	G8ZOB	2,565	20	92JN	50	27el	GI4OPH	358
5	G6CSY/P	1,143	8	01BH	0.8	23el	G4FRE/P	300

2,320MHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G4ALE/P	6,689	32	01OI	35	1·6m dish	G4BRK/P	387
2	G4CBW/P	6,269	27	03CE	70	2·5m dish	PA2HJS	462
3	G3OHM/P	3,190	21	92GB	30	4ft dish	FC1GBU/P	276
4	G4BRK/P	2,909	11	70QX	45	1·2m dish	G4BYV	410
5	G4OOK/P	2,715	18	01QX	5	1·2m dish	G4BRK/P	403
6	G8VOI/P	1,748	10	90MX	10	3m dish	PE0MAR/P	369

2,320MHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G8DER	1,850	7	93GN	30	1.4m dish	PE1ALA	433
2	G4PMK	194	1	93GT	10	0.6m dish	G3OHM/P	194
3	G8ZOB	58	1	92JN	1	5ft dish	G3OHM/P	58

3,456MHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G4JAR/P	934	7	01OI	0.6	80cm dish	PA0EZ	281
2	G4CBW/P	763	4	03CE	1	2·5m dish	PA0EZ	352

5·6, 10 and 24GHz MULTI-OPERATION

Band	Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx
5·6GHz	1	G4EZP/P	7	1	01OI	1mW	1m dish	G8KBV/P
10GHz	1	G4EZP/P	449	8	01OI	0.2	50cm dish	PE0MAR/P
24GHz	1	G4EZP/P	7	1	01OI	7mW	30cm dish	G6JAD/P

3,456MHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	
1	G6DER	146	2	93GN	0·2	0·6m dish	G4CBW/P	118
2	G4PMK	27	1	93GT	2mW	0·6m dish	G6DER	27

RSGB Listener Contest 1987 results

The number of listeners entering the 1987 event was slightly down on the previous year, 38 entries were received, compared to 47 in 1986. It was pleasing to see the number of dx logs remain at a constant level, while the G entry was only slightly down on 1986. Overall, the indication is that the contest is a welcome addition to the Listener's Contest calendar.

Conditions were not all that good. Contestants managed to log plenty of stations, but it was a struggle to find the new countries. Even the dx category winner – once again Jeen Jacques Yerganian – only logged 97 countries in his 1,099 stations logged.

It was interesting to receive logs from as far afield as New Zeeland and South Africa, and these logs showed that the dx from the Pacific and Africa were active but inaudible in Europe. For example, the log from ZL·149 showed that stations from P29, C21 and KH2 were active at around 0700 on 7MHz.

The log from Jean-Jacques was exceptional, showing 24h of total dedication which earned him the overall winner's spot with plenty to spare. Congratulations also go to the other category winners — BRS87156, JA3·30356/1 and BRS52868.

Some dx entrants unfortunately used the 1986 rules and will find their scores have been reduced. However, most logs were of a high standard, but some needed re-scoring because the rules had not been followed, three had to be disqualified, and one entry to the ssb event wrongly quoted RST reports. Finally, I regret that it is not possible for logs to be returned.

The HF Contests Committee hopes that conditions in 1988 will be more favourable and that, as a result, the event will attract even larger number of entries.

BRS32525

DX-SSB

Posn	Station	Points	Multiplier	Total score
1	ONL383†	1,099	287	315,413
2	Y56·10·M	427	158	67,466
3	ORS45992/7O7	300	139	41,700
4	ZL·149	256	146	37,632
5	Y44·13†	349	102	35,598
6	ONL4738	223	90	20,070
7	Y31·92·B	168	87	14,442
8	NL·8590	126	81	10,206
9	NL·7367	217	36	7,812
10	Y64·04·A	120	59	7,080
11	JA8·3769	58	31	1,798
12	Y59·16·N*	44	17	748
13	JE1TTO***	39	15	585
14	Y39·01·E*	27	14	378
15	JA7·10052**	19	9	171
16	ZS·51660	14	11	56

Disqualified: NL·9734 and NL·10133 both having no regard to the 1:3 rule in the "station worked" column.

*3.5MHz only
**7MHz only
*** 21MHz only

DX-CW

Posn	Station	Points	Multiplier	Total score
1	JA3·30356/1†	429	147	63,063
2	ORS89020/ZS†	423	147	62,181
3	JA8·5871	13	9	117

†Certificate winners

G-CW

Posn	Station	Points	Multiplier	Total score
1	BRS52868†	369	164	60,516

G-SSB

Posn	Station	Points	Multiplier	Total score
1	BRS87156†	447	169	80,613
2	BRS88952†	445	129	57,405
3	BRS88925†	341	137	46,717
4	BRS90400	381	95	36,195
5	BRS88969	207	117	24,219
6	RS90338	264	88	23,232
7	BRS32525	200	75	15,000
8	G1VDW	155	80	12,400
9	RS87949	149	82	12,218
10	RS90173	126	89	8,694
11	RS87949	125	56	7,000
12	BRS90258	141	43	6,063
13	BRS20249	45	39	1,755
14	BRS62088	55	23	1,265

Disqualified: G1ZHL—log received after closing date for entries.

September 1987 70MHz Trophy Contest results

This contest was again blessed with good conditions, especially in the north/south direction, with possibly a new distance record of 757km between GM4ZUK/P and G4ADV/P beating the previous claim set in this contest last year.

The weather was reasonably good over most of the country, and there was a high level of activity from all call areas except GD and GI with several Class Bs experiencing their first foray into a 70MHz contest. Despite this, many logs commented on that conditions, poor activity, no GU/GJ/Class B etc. Also several of the leading stations suggested that the contest was too long – in fact it is rumoured that the eventual winner actually thought that the contest had finished and had started packing up when they discovered that there was still another hour left!

Altogether approximately 180 callsigns appeared in the logs including 36 Class Bs. This was, as G3UKV suggests, probably the highest level of activity in the last 10 years. Interestingly, the three leading GMs actually worked 125 different stations, possibly showing that they hadn't all worked everything within range in the allotted time and maybe suggesting that a case could even be made for extending next year's contest.

To achieve a good result in this event requires considerable effort and dedication together with good equipment and operating. This can be seen in the lengths that teams went to enter this year, although GM4ZUK is considering rebuilding Hadrian's Wall to repel the invading English next year.

Therefore well earned congratulations to the trophy winners, GM4LIP/P, who won so decisively that they could actually have gone home when they first thought. Certificates also go to GM8TFI/P, G4RFR and G4MGR together with an additional certificate to G3UKV for being the leading single-operator fixed station.

G4NBS

FIXED SECTION

Posn	Callsign	Points	QSOs	Loc	Best dx	Km	Pwr	Ant
1	G4RFR	756	95	90AS	GM4ZUK/P	686	160	2x12el
2	G4MGR	655	85	83KH	GJ3YHU	458	130	4el
3	G3UKV	588	92	82RR	GM4ZUK/P	467	80	5el
4	G1DOX	574	65	84JC	GU2HML	520	30	3el
5	G6APZ	491	77	93DC	GJ3YHU	432	80	5el
6	G4ASR	480	70	81MX	GM4ZUK/P	551	120	6el
7	G3VIP	477	57	93XN	G4ADV/P	506	100	4el
8	G4EPA	444	73	92KI	GM4ZUK/P	517	85	4el
9	G4ZTR	437	48	01LV	GM4ZUK/P	603	50	5el
10	G3XBY	398	65	92DG	GM4ZUK/P	521	100	3el
11	G4ULS	388	64	82TI	GM4ZUK/P	509	100	4el
12	G4AFJ	333	50	92HO	GM4ZUK/P	488	60	7el
13	G4CAX	313	46	83RF	GM4ZUK/P	411	100	HB9CV
14	G8ULU	298	25	01NI	GM4LIP/P	635	25	3el
15	GW4HBK	294	40	81KP	GM4LIP/P	444	60	3el
16	G3UEY	260	42	82XC	GM4ZUK/P	538	20	4el
17	G8PNN	258	33	95EF	G4ADV/P	596	60	3el
18	G3SHY	252	37	91TQ	GM4LIP/P	538	35	2el quad
19	G4PMK	239	50	93GT	G4ADV/P	465	75	8m-3el
20	G3NKS	218	31	81XU	GM4ZUK/P	566	3	3el
21	G4MWO	208	31	83OK	GM4ZUK/P	390	37	Dipole
22	G4XFD	194	33	83RE	G4ADV/P	368	10	HB9CV
23	G6MXL	162	20	80XR	GM8TFI/P	530	10	3el
24	G4EYD	123	26	92AJ	GM4LIP/P	410	60	2 elquad

Check log also acknowledged from G3UNM with thanks.

OPEN SECTION

Posn	Callsign/P	Points	QSOs	Loc	Best dx	Km	Pwr	Ant
1	GM4LIP	1,655	105	75CH	GJ3YHU	720	180	2x8el
2	GM8TFI	1,525	106	85DJ	GJ3YHU	694	150	2x5el
3	GM4BVY	1,478	105	74NV	GJ3YHU	657	150	2x7el
4	EI9FK	1,089	88	63WC	G8ULU	530	100	5el
5	G4ADV	1,055	78	70JH	GM4ZUK/P	757	80	7el
6	GW3UAX	1,019	96	71OW	GM4ZUK/P	574	80	10el
7	GM4ZUK	945	67	86RW	G4ADV/P	757	160	7el
8	GM4ZAP	801	61	85WT	G4ADV/P	645	150	2x5el
9	G3TCU	733	93	81RF	GM4ZUK/P	635	180	2x6el
10	G4RXD	592	66	84IH	G8ULU	439	8	5el
11	G0CCC	575	98	91IH	GM4ZUK/P	631	100	8el
12	G3BPM	565	62	80KW	GM4ZUK/P	668	30	4el
13	G4TGB	334	48	03EF	G4ADV/P	502	50	Holo
14	GM3TAL	148	11	75IU	G4CWH/P	825	30	3el

SWL SECTION

Posn	Station	Points	QSOs	Loc	Best dx	Km
1	BRS32525	143	28	JO01	G4ADV/P	390
2	BRS28198	94	13	JO00	GM4BVY/P	560

10GHz Cumulative results 1987

This year's contest saw a decrease in entries in the wideband section and a slight increase in the number of entries in the narrowband section over last year. Disappointingly, after requests for its inclusion, their were no entries in the IV sections. Activity in both sections was higher, allowing good distances to be worked by most entrants, including some rarely activated prefixes.

The standard of log keeping wes generally high; however, there were the usual crop of incorrect serial numbers recorded alongside 59 reports. There were also a couple of stations who managed to incorrectly convert the NGRs of well used sites to locators. These errors were noted by other alert entrants. Those stations who have not included a 427-86 cover sheet have been treated as check logs.

The winner, by a narrow margin in the wideband section, P Flint, G4EFT, used a doppler module producing 7mW on transmit which also drove a Larsholt tuner at 105MHz on receive. The antenna was a 0·46m dish. It is interesting to note that the leading four stations this year all operated from the south coast, a reversal of the situation last year where the leading four operated from the mountainous north.

The winner in the narrowband section I Lamb, G8KOW, used an IC202 and commercial solidstate transverter running 0·2W to a 0·46m dish.

Certificates go to G4EFT (winner, wideband), G8KOW (winner, narrowband, and runner-up wideband) and F8WN (runner-up, narrowband, and leading foreign station). In addition G4EFT will receive the Alpha Award.

G4FRE

WIDEBAND SECTION

Posn	Callsign	Points	QSOs	Best dx	Km	Per	Loc(s)
1	G[U]4EFT/P	2,554	38	G4EML/P	219	3,4,5	89,90
2	G[W]8KOW/P	2,522	35	GU4EFT/P	163	3,4,5	80,90
3	F8WN/P	1,979	11	G8CUX/P	184	3,4,5	IN99
4	G4EML/P	1,876	42	GU4EFT/P	219	2,3,4	90,91
5	G3PHO/P	1,845	25	G0BTA/P	136	1,2,5	93,94
6	G4ETU/P	1,819	32.5	GU4EFT/P	205	2,3,4	90
7	G2DSP/P	1,658	32	F8WN/P	172	2,3,4	90
8	G8LSD/P	1,599	36	F8WN!P	175	2,3,4	00,90
9	G3JMB/P	1,164	33	F8WN!P	175	2,4,5	90
10	G[W]3UYM/P	1,060	14	G3PHO/P	121	3,4,6	82,92
11	G4GMV/P	837	18	G8AGN/P	116	2,3,6	82
12	G4FPV/P	811	18	G8AGN/P	116	3,5,6	82
13	G4ELM/P	674	26	G3JHM/P	98	2,4,5	90,91
14	G8UDT/P	665	10	GU4EFT/P	212	2,4,5	90
15	GM0GCG/P	125	3.5	GM4ISM	66	3,4,5	76

Checklogs received with thanks from G3NWU/P, GI8GJX/P, GW6MEN!P, G3NEO/P, G0BTA/P, GI MPW/P, GW3ATM.

Disqualified: Rule 2; G3ZME/P, G3OXL/P,

NARROWBAND SECTION

Posn	Callsign	Points	QSOs	Best dx	Km	Per	Loc(s)
1	G8KOW/P	1,329	16	G3YGF/P	153	2,3,6	90,92
2	F8WN/P	880	6	G4FUF/P	196	2,3,4	IN99
3	G4EML/P	558	11	G8KQW/P	108	3,5,6	90,91
4	G4ELM/P	369	12	G4FUF/P	93	1,4,5	90,91

Chocklog received with thanks from GI8GJX/P

7MHz CW Contest date change

The HF Contests Committee announces that to avoid a clash with the ARRL DX CW Contest, the dates shown in the rules for the 7MHz CW Contest, published in *Rad Com*, October 1987; have been changed to 27, 28 February 1988.

CONTESTS CALENDAR

RSGB HF CONTESTS

Jan	1-8, 3·5 and 7MHz Cumulative (Rules in October issue)
10 Jan	AFS
6, 7 Feb	7MHz Phone (Rules in October issue)
13, 14 Feb	First 1·8MHz
27, 28 Feb	7MHz CW (Rules in October issue) (NOTE NEW DATES)
12, 13 Mar	Commonwealth
19 Mar	Town and County
3 April	Ropoco 1 (Rules in January issue)
17 Apr	Low Power Fixed
15 May	Region Round-up
4, 5 Jun	NFD (IARU CW)
25, 26 Jun	Summer 1·8MHz
9, 10 Jul	SWL
17 Jul	Low Power FD
17 Aug	Hopscotch
28 Aug	Ropoco 2
3, 4 Sep	SSB FD
Sep-Oct	28MHz Cumulative CW
9 Oct	21/28MHz SSB
18 Oct	21MHz CW
12, 13 Nov	Second 1·8MHz
Nov-Dec	28MHz Cumulative Phone

RSGB VHF CONTESTS

31 Jan	70MHz Cumulative (Rules in January issue)
7 Feb	144MHz CW (Rules in January issue)
14 Feb	70MHz Cumulative (Rules in January issue)
21 Feb	432MHz Fixed and AFS and SWL (Rules in January issue)
28 Feb	70MHz Cumulative (Rules in January issue)
5, 6 Mar	144/432MHz and SWL (Rules in January issue)
13 Mar	70MHz Cumulative (Rules in January issue)
27 Mar	70MHz Cumulative (Rules in January issue)
2 Apr	50MHz Fixed (Rules in January issue)
3 Apr	70MHz Fixed (Rules in January issue)
9, 10 Apr	144MHz and SWL (Rules in January issue)
17 Apr	10GHz Cumulative (Rules in January issue)
7, 8 May	432MHz-24GHz
15 May	10GHz Cumulative (Rules in January issue)
29 May	432MHz Trophy and SWL
12 Jun	432MHz FM
19 Jun	10GHz Cumulative (Rules in January issue)
2, 3 Jul	Jubilee VHF NFD
10 Jul	10GHYz Cumulative (Rules in January issue)
30 Jul	144MHz Low Power and SWL
31 Jul	432MHz Low Power and SWL
7 Aug	10GHz Cumulative (Rules in January issue)
14 Aug	1,296MHz Trophy and 2320MHz Trophy
3, 4 Sep	144MHz Trophy/IARU VHF and SWL
11 Sept	10GHz Cumulative (Rules in January issue)
18 Sept	70MHz Trophy and SWL
1, 2 Oct	432MHz-24GHz/IARU UHF/SHF
6 Oct	432MHz Cumulative
14 Oct	1·3/2·3GHz Cumulative
22 Oct	432MHz Cumulative
23 Oct	50MHz Trophy
30 Oct	1·3/2·3GHz Cumulative
5, 6 Nov	144MHz CW
7 Nov	432MHz Cumulative
15 Nov	1·3/2·3GHz Cumulative
23 Nov	432MHz Cumulative
1 Dec	1·3/2·3GHz Cumulative
4 Dec	144MHz Fixed and AFS and SWL
9 Dec	432MHz Cumulative
17 Dec	1·3/2·3GHz Cumulative

OTHER CONTESTS

Jan-Dec	UBA SWL (Rules in December HF)
1 Jan	Happy New Year (Rules in December HF)
9, 10 Jan	YL/OM Midwinter (Rules in December HF)
16, 17 Jan	AGCW-DL Winter (Rules in December QRP)
16, 17 Jan	Michigan QRP Club (Rules in December QRP)
16, 17 Jan	Hungarian DX (Rules in January HF)
29, 31 Jan	CQ WW 160m CW (Rules in January HF)
30, 31 Jan	UBA CW (Rules in January HF)
6 Feb	AGCW-DL HTP80 Straight Key party (Rules from G3FKM)
26, 27 Feb	CQ WW 160m SSB (Rules in January HF)
27, 28 Feb	UBA SSB (Rules in January HF)

Club News

"CLUB NEWS" CHANGES

Starting with the March issue, the "Events Diary" in the *News Bulletin* will be expanded to include club news. However, in an attempt to reduce the number of pages used, a more abbreviated format listing clubs alphabetically under counties and giving the date and subject of the meeting will be used.

In the same way, as in GB2RS, natter nights and committee meetings will not be listed. The full details of when and where clubs meet, the contact person and telephone number will be published twice yearly in the *RSGB Call Book* and twice yearly in the *News Bulletin*.

In addition, "Around the Groups" in the *News Bulletin* will be expanded to include more interesting items of news from clubs, groups and societies. The deadlines for the "Events Diary" and "Around the Groups" are Monday 25 January, and Monday 1 February, respectively. Items for both should be sent to David Gough, G6EFQ, News & Information Department, RSGB HQ.

CHESHIRE, CUMBRIA, G MANCHESTER, I o M, LANCS, MERSEYSIDE

Accrington (North West Repeater Group GB3RF·GB3PF·GB3AE) – 8pm, third Thursday of the month. The Glabe Bowling Club, Willows Le, Accrington. Sec G0DTI.

Barnoldswick (Rolls·Royce ARC G3RR) – 7.30pm, Wednesdays. The Rolls·Royce Sports & Social Club, Barnoldswick. Sec G4ILG, tel 0282 812288.

Barrow (South Lakeland ARS) – First and third Thursdays of the month, 8pm. The Norweb Sports & Social Club, rear of Ormsgill Hotel, Barrow·in·Furness. Sec G4VKE, tel 0229 65359.

Blackburn (East Lancs ARC, G3NTJ/G1ELC) – 7.30pm, twice monthly, Conservative Club, Cliff St, Rishton. Info G6LXU, tel 0254 887385.

Bolton (BARC G0BWC/G1ONE) – 7.30pm Tuesdays. The Dean Sports Complex, New York Junction Road, Bolton. Sec GI AEQ.

Bolton (B&DARS G8WY) – 8pm. Horwich Leisure Centre, Victoria Rd, Horwich. Sec G4TOL, tel 55092.

Burnley (B&DARC) – Second and fourth Tuesdays of the month, 7.30pm. The Adult Education Centre, School La, Burnley. Sec G0BQC, tel 0282 39765.

Bury (BRS G3BRS) – 8pm, Tuesdays. Mosses Community Centre, Cecil St, Bury. Info G1VOE. Please note annual rally: 11am Sunday 13 March 1988, at Castle Leisure Centre, Bolton St, Bury; talk-in S22.

Carlisle (C&DARS) – 18 Jan ("PSUs", GM4FHV), 8 Feb ("Valve regen receivers", G3MNL). 7.15pm, Mondays. The Scout Hut, Trinity Rd, Carlisle. Sec G3XWA tel 0228 27463.

Chester (C&DARS G3GIZ/G8GIZ) – 5 Jan (AGM). 8pm, Chester RUFC, Hare Lane, Vicars Cross, Chester. Info G6IFA, tel Chester 336639.

Chorley (The Leyland Hundred ARG) – 7.30pm, second Monday of the month. The Grapes Pub, Town Rd, Croston. Sec G4YSU, tel 0772 600239.

Congleton (CRC) – First Wednesday of the month, 8pm. The Library, Congleton. Sec G60KN, tel Crewe 765005.

Crewe (South Cheshire ARS G4LVR/G6TWB) – Second Monday of the month, 8pm. LMR Sports Club, Goddard St, Crewe. Info G1PUV, tel 07816 73185.

Derwen (DARC G4JS) – 7.30pm, Highfield WMC, Ratcliff St, Darwen. Sec G2AKK, tel 0254 73767.

Eccles (E&DARS G3GXI G8GXI) – 9.30pm, Tuesdays. Duke of York Hotel, Church Street, Eccles. Sec G8KRG, tel 061·773 7899.

Ellesmere Port (EP&DARS G3CSA) – Alternate Tuesdays, 7.30pm. The Grosvenor Hotel, Ellesmere Port. Info G4STZ, tel 051·608 8001.

Fylde (FARS) – 5 Jan (AGM), 19 (Informal), 2 Feb (Visit to Blackpool Police HQ), 7.45pm. The Kite Club, Blackpool Airport. Sec G8GG, tel 725717.

Isle of Man (IoM ARS) – 8pm, Mondays. The Howstreke Hotel, Harbour Rd, Onchan. Info GD4GWQ, tel 0624 22295. Additional local meetings Thursdays at the Br Legion, Douglas St, Peel, and on Fridays at The Perwick Bay Hotel, Port St Mary.

Leyland (Central Lancs ARC) – First and third Mondays of the month, 8pm. The Priory Club, Broadfield Drive, Leyland. Info G4QBK, tel Chorley 74451.

Liverpool (L&OARS G3AHD/G8WCL) – 5 Jan (Quiz), 12 (Open night), 19 ("Contests", G4CVZ), 26 ("RSGB Region 1 representation", G3XSN), 2 Feb ("Construction report", G6FBK). RAE and cw classes before general meeting, 8pm. The Churchill Conservative Club, Church St, Liverpool 15. Sec Lynn, tel 051·728 8811. Members also meet on Thursdays at 10am at "The Wharf", Albert Dock complex; for coffee, lunch and natter; all welcome.

Macclesfield (M&DARS, G4MWS/G1MWS) – Tuesdays, 8pm. The Fermain Club, Oxford Rd, Macclesfield. Tel 0625 24534.

Manchester (South MRC G3FVA/G3UHF) – 1 Jan (Closed), 8 ("Dxpedition to the Isle of Man" – slides & talk), 15 ("Roses", G4SUB), 22 ("Oscilloscope measurements", G4AOK), 29 ("1·8MHz df equipment and contests", G3WFT), 5 Feb (TBA). 8pm. Sale Moor Community Centre, Norris Rd, Sale, Cheshire. Info G3WFT, tel 061·973 1837.

Manchester (Trafford ARC) – Thursdays, 7.30pm, The Sea Cadet Unit, Bredshaw Lane, Strelford. Sec Graham, tel 061·748 9804.

Manchester (WMRC) – Wednesdays, 8pm. Astely & Tyldesley Miners Welfare Club, Meanly Rd, Gin Pit Village, Astely, Tyldesley, nr Manchester. Info G1I00, tel 0204 24104 .

Maryport (Solway RS G4BBX) – Wednesdays. Maryport Educational Settlement, High St, Maryport. Info G0AFP, tel Cockermouth 826461.

Marsaysida Raynet – Info from county controller G8RXB, tel 051·638 5879.

Morecambe (MBARS G1MBR/G4YBS) – 7.30pm, Tuesdays. Trimpell Sports & Social Club, Oul Moss La, Morecambe. Morse classes alternate Tuesdays. Info from G4ZJL, tel 0524 52042.

Northern Amateur Radio Confederation – Details from Kathy, G4ZEP, tel 061·652 8617.

Oldham (OARC) – Thursdays, 8.30pm, The Moorside Conservative Club, Ripponden Rd, Moorside, Oldham. Sec G4ZEP, tel 061·624 7354.

Ormskirk (O&DARC G4SNX/G1SNX) – First Thursday of the month, 8pm. Ormskirk Community Centre. Info G1KDF, tel 0695 74868.

Penrith (Eden Valley RS) – 21 Jan ("Homebrew transmitters", G6FRZ). 7.30pm. Ullswater Centre, Penrith. Info G4FUI, tel Penrith 66728.

Preston (PARS) – Alternate Thursdays, 8pm. The Lonsdale Club, Fulwood, Preston. Info G3ZXC, tel 0772 718175.

Rossendale (RARS) – Wednesdays, 8pm. The Huntsman, Burnley Rd, Lovedough, Rossendale. Sec G4VVK, tel 0706 214076.

St. Helens (St H & OARC) – 7.45pm, Thursdays. Community Resource Centre, Old Central Secondary School, College St, St Helens. Sec G1OMY, tel 0744 818455. CW classes available before main meeting.

Skelmersdale (S&DARC) – 8pm, Thursdays. Info G4ZPY, tel 0704 894299.

Southport (S&DARC) – Fortnightly, 8pm. St Mark's Church Hall, Scarisbrick. Sec G4YYV, tel Southport 79825.

Southport (S Raynet Group, G1SRG) – 8pm, first Wednesday of the month, The Richmond Hotel, Scarisbrick New Rd, Southport. Info from G4ROX, tel 25172.

Stockport (SRS) – 13 Jan ("Ham radio USA style", G3ZDM), 27 ("Computer interfacing", G0HAL). 7.45pm. Dialstone Community Centre, Lisburne La, Stockport. Info G4ECI, tel 061·439 3831.

Tarporley (Mid·Cheshire ARS, G3ZTT/G8ZTT) – 6 Jan (Activity night on the air), 20 (Construction night), 13 & 27 (TBA). RAE and morse classes, Wednesdays, 7.30pm. Colesbrook Village Hall, Nr Tarporley. Info G1SIB, tel 0260 271505.

Thornton Cleveleys (TCARS) – 7.45pm, Mondays. First Norbeck Scout HQ, Carr Rd, off Fleetwood Rd, Bispham, Blackpool. Info G4BFH, tel 0253 821827.

Warrington (WARC, G4CDA/G6WRC) – 8pm, Tuesdays. Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington. Info G0CBN, tel 0925 444317.

Wigan (Douglas Valley ARS, G3BPK) – 8pm, first and third Thursdays of the month. Standish Conservative Club, School La, Standish, Nr Wigan. Info G4GWG, tel Wigan 211397.

Wigan (W&DARC, G0HRW) – 7.45pm, Tuesdays. Poolstock Cricket Club, Poolstock La, Wigan. Sec G0DTY, tel 0942 47416.

Wilmslow (North Cheshire RC) – Details from G4WCE, tel 061·980 5173.

Wirral (WARS, G3NWR) – First and third Wednesdays of the month. Club Room, Ivy Farm, Arrowe Park Road, Birkenhead. Sec G3VEB.

Wirral (W&DARC, G4MGR/G8WDC) – 13 Jan (AGM), 26 (Surplus equipment sale), 8pm. Irby Cricket Club, Mill Hill Rd, Irby. Info G1VHO, tel 051·625 5490.

Woodford (RATEC) – 8pm, Mondays. The Br Legion Club, Moor La, Woodford, Nr Bramhall. Info G4SFU, tel 061·485 3912.

Wyre (WARS) – Second and last Wednesdays of the month, Breck Squash Club, Breck Rd, Poulton. Sec G4UHI, tel 0253 854745.

Happy New Year to you all. The information above is the latest in my possession. *G3XSN*

HUMBERSIDE N OF HUMBER: N S AND W YORKS

Bernsley (UK FM Group G8KF M) – 3 Jan (Monthly meeting). Royal Hotel. Details G4UNA.

Denby Dale (DD&DARS G4CDD) – Wednesdays. Pie Hall. Details G4GZB.

Goole (GR&ES G0GLE) – 7 Jan (Natter night), 15 (Construction competition), 22 (Night of event), 29 (Social evening at Black Swan). West Park Pavillion. Details G0GLZ, tel 0405 69968.

Halifax (H&DARS G2UG) – 19 Jan ("Raynet", G6COG). Running Man PH. Details G0DLM, tel 0422 202306.

Halifax (Northern Heights G2SU) – 6 Jan (Video film evening), 20 ("Compact discs", G3USH). Meetings at Bradshaw Tavern. Details G3UI, tel 0422 60574.

Hornsea (HARC G4EKT) – Wednesdays. The Mill. Details G4YTV, tel 0401 62498.

Hull (H&DARS G3AMW) – Fridays. West Park Recreational Centre. Details G1RVS, tel 0482 845326.

Hull (Operation Raleight GB4ORH). Details G1TFT, tel 0482 28217.

Humbersida Repeater Group – Details G4NJP.

Rae Firth, G4JMT, chairman of the Wakefield & DRS, and the Mayor of Wakefield sharing, via GB3WMD and DK0OA on 7MHz, the 40th anniversary celebrations of the radio club in their twin town of Alfeld, W Germany. *Photo* G1EOT

Keighley (KARS RS 84851) – 12 Jan (Informal meeting), 26 (AGM). Victoria Hotel. Details G1IGH, tel 0274 496222.
Leconfield (RCTARS G4GGD) – Third Thursday of the month, Normandy Barracks. Details G4EJP, tel 0964 550397.
Leeds (L&DARS G4LAD) – Mondays, Yarbury RUFC. Details G0ETL, tel 0532 784080.
Leeds (White Rose ARS GG3XEP) – Wednesdays. Moortown RUFC. Details G4ATZ, tel 0937 842790.
Maltby (MARS G4SKM) – 5 Jan (On the air), 12 (Debate), 19 (Mastermind), 23 (Annual dinner), 26 ("Slateside", G1FOC). Hellaby Community Hall. Details G1POW, tel 0709 814135.
Mexborough (M&DARS G4BTS) – Fridays, Harrop Hall. Details G1BJB, tel 0709 586329.
North Ferriby (NFUARS G0ECR) – 8 Jan ("Top band dx", G4BYG), 29 (AGM). North Ferriby Football Club. Details G1LSZ, tel 0482 493777.
North Wakefield (NWRC G4NOK) – Mondays. White Horse ph. Details G4RCH, tel 0532 536633.
Pontefract (P&DARS G3FYQ) – Carleton Community Centre. Details G6QJX, tel 0977 83792.
Ripon (R&DARS G4SJM) – Thursdays. Old air raid shelter. Details L Bulman, The Lodge, Lister House, Sherow.
Scarborough (SARS G4BP) – Mondays. Scarborough Cricket Club. Details G4ZNZ, tel 0723 514767.
Sheffield (SARS) – Mondays. Firth Park Pavilion. Details G8ZHG, tel 0742 395287.
Spen Valley (SVARS G3SVC) – 7 Jan ("Raynol", G4IOD), 21 ("Development of magnetic recording", G6DLA). Old Bank WMC. Details G4PHR, tel 0924 499397.
Todmorden (T&DARS G4WYT) – 4 Jan (Construction competition), 18 (Natter night). Queen Hotel. Details G1GZB, tel 0706 81 7572.
Wakefield (W&DRS G3WRS) – Ossett Community Centre. Details G4VPY, tel 0532 820198.
York (YARS G3HWW) – Fridays. United Services Club. Details G3WVO, tel 0904 422804.
York (YRCA G4YRC) – 6 Jan (Home security), 13 (On the air), 20 (CW RAE and operator practice), 27 Jan (Social evening). York City Arms. Details G1FTA, tel 0904 704634.

G4EJP

Ted, G3TMN, and Roe, xyl of G4IUE, cutting the cake which Roe baked to celebrate the 40th anniversary of the York ARS. *Photo*: G4EMA

HEREFORD & WORCS, SALOP, STAFFS, WARKS, W MIDLANDS

Aldridge (Barr Beacon ARC) – Alternate Mondays, 7.30pm, Barr Beacon Community School, Old Hall Lane, Aldridge. Sec, G1OBA. Tel: 021-353 6233.
Ariel Radio Group – Club for BBC personnel only. Contact G3DEF or G3PGG.
Atherstone (ARC) – 11 Jan (Preparing for contests), 25 (Informal night at The Bull). Second and fourth Mondays in the month. Upper School, Long St, Atherstone. Sec G4IWA, tel 0827 713670.
Birmingham (Aston University RS) – Monday lunchtime and Thursday evenings plus UCCA visiting day afternoon during term. Introductions via admissions tutor or G6VWA. Sec G6VWA, tel 021-359 3611, ext 5115.
Birmingham (Midland ARS) – Mondays (Construction night), Tuesday (1st, Committee meeting), (2nd, Computer night), (3rd, Lecture), 4th, Raynet group meetings), Wednesdays (Morse and natter night), Thursdays (Night on the air), Fridays (RAE class), Weekends (Contests). Unit 5, Henstead House, Henstead St, (off Bromsgrove St). Sec G8BHE, tel 021 -422 9787.
Birmingham (Mirfield ARC) – Mondays (HF and construction), Tuesdays (CW workshop, G3MRP and G4SPY), Wednesdays (Chat night), Thursdays (RAE tuition), Fridays (Morse class), 7pm, Mirfield Centre, Lea Valley, Birmingham. Sec G0FIX, tel 021-784 4741.
Birmingham (Stade RS) – First Friday in the month, 7.45pm. Community Centre, 75 Kingsbury Road, Erdington, Birmingham. Sec G4FGF, tel 021-770 3474.
Birmingham (BSRS) – Thursdays (HF operating evening). Wednesdays (VHF operating evening), first Wednesday of the month (Formal meeting). 8pm. Hampstead House, Fairfax Rd, West Heath, Birmingham. Sec G6KOA, tel 021-458 1941.
Birmingham (University RS) – 1pm daily. Club night Fridays, RAE classes Tuesdays, 7.30pm. Club room, 2nd floor, Union Building. (Midland Bank entrance and follow the signs). Sec GW4YEG.
Bridgnorth (Severn RS) – Sec E Churchyard, 11 Greenfields Drive, Bridgnorth.
Bromsgrove (BARS) – Second and fourth Tuesdays in the month, 8pm. Aston Fields WMC. Sec G4XOW, tel 33959.
Bromsgrove (B&D ARC) – Thursdays (club net 144·575MHz and morse tuition). Alternate Fridays 8pm, Avoncroft Arts Centre, Bromsgrove. Sec G4NYH, tel Bromsgrove 73847.
Burton on Trent (BOTARS) – Wednesdays, 8pm, Stapenhill Institute, Main St, Stapenhill. Sec G4HBY, tel 0283 62344.
Cannock Chase (CCARS) – Thursdays, 8pm. Bridgetown War Memorial Club, Union Street, Bridgetown, nr Cannock. Sec G8UYZ.
Cheadle (Moorlands ARS) – Thursdays, Ex-Service Centre, Bank St, Cheadle. Sec G4OUG, tel 0538 756323.
Coventry (CARS) – 8 Jan (Computer night), 15 (Night on the air and morse tuition), 22 (Packet radio demonstration), 29 (Annual dinner). 8pm. Scout HQ, 121 St Nicholas St, Radford, Coventry. Sec G3UOL, tel 414684.
Coventry (CTARS) – Mondays, 7pm, Rm E17 Wynyray Building, Technical College, Coventry.
Coventry (Warwick UARC) – 7.30pm, Thursdays, in the club shack. Sec G0GWA, tel Coventry 70764.
Droitwich (DARC) – Second and fourth Mondays in the month, 8pm. Scout HQ, Droitwich. Sec G4HFP, tel 02993 3818.
Dudley (DARC) – Mondays, 7.45pm, Allied Centre, Greenham Alley, Tower St, Dudley. Sec G4NRA, tel 0384 278300.
Evesham (Vale of Evesham RAC G0ERA) – G4UXC, tel Evesham 831508.
Evesham (BBB Contest Group) – Private club. Contest working only. Sec G4WAD, tel 0386 6246.
Halesowen (Midlands ES&SC) – 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021 -747 8784.
Hereford (HARS) – 1 Jan ("Greyline dx and 50MHz propegation", G4ASR), 15 ("Contest operating in Bermuda", G4CNY). Three Counties Training Centre, 12a The Caille Market, Hereford. All other meetings, 8pm, Civil Defence HQ, Gaol St, Hereford. Sec G3WRO, tel 0432 54064.
Keele (University ARS) – Mondays, 7.30pm. Room 112, Physics Building. Sec G4TQB, tel 0782 621111.
Kidderminster (K&DARC) – 5 Jan (Video evening), 19 ("Antennas for top band", G4VZA), alternate Tuesdays, 8pm. Vice-Presidents Club, Harriers Football Ground, Hoo Rd, Kidderminster. Sec G8WOX, tel 0562 751584.
Lichfield (Ched RC) – Mondays, 8.30pm. Cricket Club, Birmingham Road, Lichfield. Sec G4VKA, tel 0543 252646.
Malvern (M Hills ARC) – 8pm second Tuesday in the month. Red Lion Inn, St Anne's Rd, Malvern. Sec G4BVY, tel 06845 66822.
Much Wenlock (MW ARES) – Second and fourth Mondays, 8pm. Raven Hotel, Much Wenlock. Sec G3ZSL, tel 07462 861332.
Oswestry (ORD ARC) – First Tuesday in the month, 8pm. Gobowen. Third Tuesday, 8pm, Bell Hotel, Oswestry. Sec GW0DLW, tel 0691 831023.
Redditch (RARC) – 8pm. WRVS centre, Ludlow Rd, Redditch. Sec G3EVT, tel 0789 762041.
Rugby (ATS) – 5 Jan (New Year natter night), 12 (Constructors corner), 7.30pm, Cricket Pavilion, "B" entrance, Rugby radio station. Sec G8TWH.
Shrewsbury (Salop ARS) – 7 Jan (Bring and buy), 14 (Special event night), 21 (Video night), 28 (HF night on the air), Thursdays, 8pm. Old Bucks Head, Frankwell, Shrewsbury. Sec G0EIY, tel 0743 67799.
Solihull (SARS) – Third Thursday in the month. The Shirley Centre, Stratford Rd, Shirley. Sec G8AYY, tel 021-783 2996.
Solihull Contest Group – Sec G4PYR, tel 021 744 1558 or Prestel 217458337.
Stafford (SARS) – Tuesdays, 8.30pm. Coach and Horses, Pasturefields. Sec G6DAT, tel 08894 2453.
Stoke on Trent (SoT ARTS) – Thursdays 7.30pm. The Cottage, 2a Racecourse Road, Oakhill. S·o·T. Sec G4IMV, tel 0782 613207.
Stoke on Trent (North Staffs ARC) – 8pm. Herold Clowes Community Centre, Dawlish Road, Bentilee, Stoke on Trent. Sec G6MLI, tel 0782 332657.
Stone (Brit Tel ARS) – For British Telecom staff and students only. Tuesdays, 7.30pm. At college. Sec G8ATB, tel (works) 0785 762593.
Stourbridge (SARS) – 8pm and third Mondays. Robin Woods Centre, School St, (off Enville St). Stourbridge. Sec G3ZOM, tel 0384 288900.
Stratford upon Avon (StAARC) – 10 Jan ("Contesting", G3MXH), 24 (Visit to Precision Metal Spinnings). 7.30pm. Baptist Church, Payton Street, Stratford upon Avon. Sec G8OVC, tel StA 750584.
Sutton Coldfield (SCRS) – 7.30pm, second and fourth Mondays in the month. Public Library, Sainsbury Centre, Sutton Coldfield. Sec G3CNV, tel 021-354 4369.
Tamworth (TARS) – Mondays, 8pm, Rugby Club, Colton Green, Tamworth. Sec G4SRI, tel 0827 68137.
Telford (TARS) – 6 Jan (Night on the air), 13 (Homebrew surgery night), 27 ("Contest planning", G6ZHV). 8pm, Dawley Bank Community Centre, Dawley, Telford. Sec G1JNZ, tel 592317.
Tenbury (TARS) – 7.45pm, Thursdays. The Barn, Pool House, Hanley Childe, Tenbury Wells. Sec G6POX, tel 08854 274.
Walsall (WARC) – Wednesdays, 8pm, Forest Comprehensive School, Bloxwich. Sec G6HZI, tel 0922 32607.
Warley (Sandwell ARC) – Mondays (Club night), Wednesdays (Morse classes), Thursdays (Club night), 7.30pm, Broadway, Oldbury, Warley. Sec G4UMY, tel 021-422 1554.
Warwick (Mid-WARS) – 12 Jan (Night on the air), 8pm, second and fourth Tuesdays in the month. St John Headquarters, 61 Emscote Rd, Warwick. Sec G0HIH, tel Marton 632370.
West Bromwich (WB ARC) – Sundays, 8pm. "Hop and Barleycorn", Dartmouth St, West Bromwich. Sec tel 021-553 0531.
West Bromwich (WB Central RC) – 7pm Sundays, Sandwell Hotel, High St, West Bromwich. Sec G4ZAD, tel 0902 48263.
West Midlands Police ARC – Sec D Mytton, tel 021 -458 3236.
Willenhall (WARS) – 13 Jan (CW night), Mondays (Morse tuition on 144·475MHz, 7.30pm), Wednesdays (Club meeting), Thursdays (Morse tuition on 144·475MHz, 7.30pm), 8.15pm, Wednesdays, Cross Keys, Willenhall. Sec G0EGG, tel 0902 734475.
Wolverhampton (WARS) – 8pm, Tuesdays. Electricity Sports Club, St Marks Rd, Chapel Ash, Wolverhampton. Sec K Jenkinson, tel 0902 24870.
Worchester (WARC) – 8pm. Oddfellows Club, New St, Worcester. Sec G4RBD, tel 641733.
Worcester Moonbounce Society – Sec P Crosland, tel 0905 620041.
Wordsley (WPC) – 8pm. Vine Inn, Camp Hill, Wordsley. Sec G4VJU.
Wythall (WARC) – 7.30pm, Tuesdays. Community Centre, Silver St, Wythall. Sec G0EYO, tel 021 430 7267.

G8MWR

DERBYS, HUMBERSIDE S OF HUMBER, LEICS, LINCS, NOTTS

Allreton (A&DARC) – Mondays, 8pm ECP Social Club, Carnfield Hill, Allreton.
Bolsover (BARS) – Wednesdays, 8pm, Black Bull Hotel, Bolsover. Sec G1GNC, tel Chesterfield 824061.
Buxton (BARS) – Second and fourth Wednesdays of the month. Haddon Hall Hotel, London Road, Buxton. Sec G8YHX, tel Buxton 6800.
Bourne (BARS) – Second and fourth Wednesdays of the month. Edenham Village Hall. Sec G1TRT.
Derby (D&DARS) – 2 Jan (Junk sale), 13 (Subscription night), 7.30pm, 119 Green Lane, Derby. Sec G3KOF, tel Derby 772361.
Derby (Nunsfield House ARG) – Fridays, 7.45pm Nunsfield House, Boulton Lane, Alvaston, Derby. Sec G4PZY, tel Derby 767994.
Glossop (G&DARG) – Last Tuesday of the month, 7.30pm. Nags Head Hotel, Charlestown, Glossop. Sec G4GNQ.
Grantham (GRC) – Third Tuesday of the month, Shirley Croft Hotel, Harrowby Rd, Grantham. Sec G8WWJ, tel Grantham 65743.
Grimsby (GARS) – Thursdays, 8pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec G3RGC.

Heanor (SE Derbyshire ARS) – Tuesdays during term. South East Derbyshire College of Education, Ilkeston Road, Heanor. Sec G8RZM.
Hinckley (HARES) – Second Wednesday of the month, 7.30pm. John Clevelans College, Bulls Lane, Hinckley. Sec G8STX, tel Hinckley 63778.
Leicester (IRS) – 4 Jan (Final arrangements for AFS), 11 (Committee meeting and hf/vhf activity night), 18 (AGM), 25 (TBA). 8pm. Gilroes Collage, Groby Road, Leicester. Sec G4PDZ, tel Leicester 871086.
Leicaster (Wigston ARC) – Fridays, 7.30pm. Wigston Reformed Church, Wigston, Leicester. Sec G6HAJ, tel Leicestar 403105.
Lincoln (LSWC) – Wednasdays, 8pm. City Engineers Club, Waterside South, Lincoln. Sec G4STO, tel Gainsborough 788356.
Loughborough (L&DARC) – Tuesdays, 7.30pm. Hind Lays College, Forest Street, Shepshed, Loughborough. Sec G0FTT.
Loughborough (WAB) – Worked All Britain Awards. Details G4IAR.
Louth (L&DARC) – Wednasdays. Sec G1TZB, tel Marshchapel 595.
Mansfield (MARS) – 1 Jan (No meeting), 19 Jan (Signal generators, G4AAH). 7.30pm. Victoria Social Club, Princes Street, Mansfield. Sec G4AAH, tel Mansfield 642719.
Marlpool (Notts & Derby Border ARC) – Tuesdays, 7.30pm. Marlpool United Reformed Church, Chapel Straat, Marlpool. Sec G4UFC, tel Ilkeston 302990.
Markat Harborough (Welland Valley ARC) – Mondays, 7.30pm. Welland Park College, Markat Harborough. Sac G3LSL, tal Markel Harborough 880746.
Matlock (Tor/ARC) – Tuesdays, 7.30pm. Greyhound Hotal, Cromford. Sec G0FWI.
Malton Mowbray (MMARS) – 15 Jan ("Raynet", G3STG). 7.30pm. St John Ambulanca Hall, Asfordby Hill, Mellon Mowbray. Sec G3NVK, tal Mellon Mowbray 63369.
Nawark (N&DARC) – First Thursday of the month, 7.30pm. Worthinglon Simpson Sports and Social Club, Baldarton, Newark. Sec G1SCF, tel Southwell 81541.
Nottingham (ARCDN) – Thursdays, 7.30pm. Sherwood Communily Centre, Woodthorpa Housa, Manstield Road, Noll'm. Sac G4EKW.
Nottingham (Plessay ARS) – Thursdays, 8pm. Plassay Communication, Beeston, Nollingham. Sec G4VFK, tal Nollingham 226321.
Nottingham (All Saints AR&EC) – Inlormation lrom All Saints Church.
Scunthorpe (S&DARC) – Tuesdays. Grange Farm Hobbies Centre, Franklin Cres, Scunthorpe. Sec G4ZGJ, tel Scunthorpa 732268.
Sleaford (S&DARC) – Last Sunday of tha month, 8pm. Hale Magna Villaga Hall, Great Hale. Sec G2HHK, tal 0529 304454.
Skegnass (S&DARS) – First Friday ot tha month, 7.30pm, While Swan, Burgh la Marsh. Sec G1ONN.
Spalding (S&DARS) – 7.30pm, The Ship Albion, Albion Street, Spalding. Sec G4NBR.
Stamford (S&DARC) – First and third Wednasdays of tha month, 7.30pm, The Rugby Club, Hampleton Drive, Stamford. Sec G4OZM, tel Stamford 54433.
Worksop (WARS) – 12 Jan (Natter night), 19 (Quiz nite), 26 (Nattar night), 2 Feb (Video night), 8pm Woodhousa Inn, Woodend Rhodasia, Worksop. Sec G4ZUN, tel Worksop 486614.

G3SZJ

BEDS, CAMBS, NORTHANTS

Badford (B & DARC) – Thursdays, 8pm. Sec G4VHF, tel: 0234-751763.
Cambridge (CUWS) – Meets during term time. Sec G6OQA, Selwyn College, Cambridge.
Cambridge (C & DARC) – Fridays, 7.30pm, during term time. Visual Aids Room, Coleridge Community College, Radegund Road, Cambridge. Sac G4TRO.
Daventry (DARC) – St John Ambulance HQ, Daventry. Sec G0DPA, tal 0327 703105.
Dunstable (D & DRC) – Fridays, 8pm, Chews House, 77 High Street South, Dunstable, Beds.
Kettering (KARC) – Sec G4VID, tal 0536 51 654.
March (M & DRAC) – Tuasdays, 7.30pm, Room 7, Neal Wada Adult Education Centre, Station Road, March, Cambs.
Milton Keynes (MK & DARS) – Second Monday of each month. "The Meeting Place", Hodge Lea, North Millon Keynes, Bucks. Sec G3ZPA, tel 0908 501310.
Northampton (NRC) – Thursdays, 8pm. Kingsthorpe Community Centre, Kingsthorpa, Northants. Sec G8EUX.
Nene Valley (NVRC) – Wednesdays. Prince of Wales ph, Well Street, Finedon, Northants.
Peterborough (PR & ES) – Third Friday of each month. Brook Street Institute, Peterborough. Sec G4PNW.
Peterborough (GPARC) – Fourth Thursday of each month, 7.30pm. Southfields Junior School, Slanground, Peterborough. Sec G1UGA, tel 0733 230088.
Shefford (S & DARS) – Thursdays, 8pm. Church Hall, Ampthill Road, Shefford, Beds. Sec G4PSO, tel Hilchin 711364.
Wisbech (W & DARC) – Thursdays, 7.30pm. RAFA Club, Astral House, Old Market, Wisbech, Cambs. Sec G4ODH. *G3DOT*

BERKS, BUCKS, OXDN

Abingdon (A Contest Club) – G4UHF enters all major vhf/uhf contests, details from G4PSU.
Aylesbury (A Vale RS) – First and third Wednesday of each month, 8pm, Hardwick Village Hall, three miles north of Aylesbury. Sec G4XZJ, tal Aylesbury 81097.
Aylesbury (A Vale Repeater Group) – Enquiries about GB3VA, GB3AV, GB3BV or group membership, contact G8BQH, tal 0296 641783.
Banbury (BARS) – Fortnightly, Wednasdays, 7.30pm. "The Mill", SpiceBall Park, Banbury. Sec G1IIO, tel 0295 51774.
Bracknall (BARC) – Second Wednesday of each month, 8pm. The Coopers Hill Community Centre, Bracknell. Details David Sugden, tal 0734 733140.
Chasham (C&DARS) – Wednesdays, 8pm. Stable Loft, The Bury Farm, Pednor Road, Chesham. Sac G0ETU, tel 09278 3911.
Chilton (Rullherford Appleton Lab ARC) – Details G4XRJ, tel Abingdon 446114.
Didcot (Vala of White Horse ARS) – First and third Tuasdays of each month, 7.30pm. Tha Waterwitch, Cockroft Road, Didcot. Sac G4SYL, tal Didcot 816845.
Halton (RAF Hallon ARECC) – Thursdays, 7.30pm. Building 168, RAF Hallon. Visitors ara requested to ookk in at main guardroom. Details Sgn Ldr Ted Turk, RAF IPTM, RAF Hallon, tal 0296 623535, ext 561.
Harwell (HARS) – Third Tuesday of each month, 7.30pm. Harwell Lab Social Club. Also informal maatings avary Tuasday, 7.30pm. Club room, Harwell Lab. Sac G6LNU, tal Wantage 68453.
High Wycombe (Chiltarn ARC) – Second and fourth Wednesdays of each month, 8pm. Sir William Ramsay School, Rose Ava, Hazlamara. Dalails G4XVP, tel 0494 33377.
Maidanhaad (M&DARS) – First Thursday and third Tuasday of each month, 7.30pm. Rad Cross Hall, The Crascent, Maidanhead. Sec G3VTS, tal Maidenhaad 25443.
Newbury (N&DARS) – Second Thursday of each month, 7.30pm. Newbury Technical College. Sac G3VOW, tel Newbury 43048.
Oxford (O&DARS) – Second and fourth Wednesdays of each month, 7.45pm. Oxford Civil Service Sports Association Club, Govt Buildings (antrance through gates marked "Driving Tests"), Marston Rd, Oxford. Sec G4PUU, tel Oxford 52859.
Reading (R&DARC) – Fortnightly, Tuesdays, 8pm. White Horse Public House, Emmer Green, Reading. Sec G4YFB, tel Reading 867820.
Slough/Burnham Beaches RC) – First and third Mondays of each month, 8pm. Haymill Community Centre, 112 Burnham Lane, Slough. Sec G6EIL, tel Maidenhead 25720.

G4HLX

G LONDON S OF THAMES, SURREY INC PART OF LONDON, N OF THAMES ADMINISTERED BY SURREY

Addiscombe (AARC) – Tuesdays (Informal), 9pm, Lion Inn, Pawsons Road, Croydon. Sec G3SJX, tel 01-656 9054.
Ashford (Echelford ARS) – Second Monday and last Thursday of each month, 8pm. The Hall, St Martin's Court, Kingston Crascent, Ashford, Middx. Sec G4VAZ, tel Sunbury 783823.
Bexleyhaath (North Kent RS) – First and third Tuesday of each month, 8pm. The Pop-in-Parlour, Graham Road, Bexleyheath. Sec G4DIB.
Biggin Hill (BHARC) – Second Tuesday of each month, 8pm. Tha Victory Social Club, Kechill Gardens, Hayes. Sec G3UMI, tel 01-462 2689.
Coulsdon (CATS) – 11 Jan (General discussion). 8pm. St Swithun's Church Hall, Grovelands Road, Purley. Sec G6HC, tel 01-684 0610.
Cray Valley (CVRS) – 7 Jan (Club quiz vs N Kent), 21 (Natter night). 8pm. Prograss Hall, Admiral Seymour Road, Eltham SE9. Details G3TAA.
Croydon (SRCC) – First and third Mondays of each month, 8pm. *TS Terra Nova*, 34 The Waldrons, Croydon. Sec G8IYS, tel 01-657 0454.
Crystal Palace (CP & DRS) – 16 Jan ("Bonsai antenna farm", G3OLM). 8pm. All Saints Parish Room, Upper Norwood, SE19. Sec G3FZL, tel 01-699 6940.
Dorking (D & DRS) – Second and fourth Tuasdays of each month. For venua and dalails contact Sac G3AEZ, tel 0306 77236.
Farnham (VHF Group) – Second and fourth Mondays of each month, 8pm. Farnham Central Club, Farnham, Surrey. Details G4EPX.
Guildford (G & DRS) – Second and fourth Fridays of aach month, 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4VRN.
Kingston (KDARS) – 20 Jan ("Maritime communications by satellite", G0FDZ). 8pm, 3 Berrylands Road, Surbiton. Details G3IMK, tel 01-397 6924.
New Cross (Clifton ARS) – Fridays, 8pm. Telegraph Hill Community Centre, Kitto Road, SE14. Sec R Hinton, 42 Sutcliffe Road, Welling, Kent.
Redhill (RATS) – Third Tuasday of each month, 8pm. Constitutional and Conservative Club, Warwick Road, Redhill. Details G3YSX.
Surbiton (308 ARC) – Last Tuesday of each month, 8pm. The Coach House, Church Hill Road, Surbiton. Details G0CFH.
Sutton & Cheam (S &CRS) – 15 Jan ("Air-spaced capacitors", G4XMK). 8pm, Downs Lawn Tennis Club, Holland Avenua, Cheam. Sac G0BWV.
Thames Valley (TVARTS) – First Tuesday of each month, 8pm. Thamas Ditton Library, Walls Road, Giggs Hill, Thames Ditton. Sac G3ENI.
Wimbladon (W & DRS) – 8 Jan ("Bring and test your own equipment", G6AJY), 29 ("Practical soldering", G4XLM). 8pm, St Andraw's Church Hall, Harbart Road, Wimbledon SW19. Sec G4RBO, tal 07373 51559. *G3NFV*

KENT, E SUSSEX, W SUSSEX

Brighton (B&DARS) – First and third Wednasdays of the month. 8pm, During winter months, meetings held in The Roast Beef Bar, Main Building Brighton Race Coursa. Details G4HLH, tal Brighton 723911.
Broadstairs (Hildarstone RS) – Fridays, 7pm. Hildarstone AEC. Details G0CLO. Tel 0843 69812.
Burgess Hill (Mid-Sussex ARS) – Thursdays, 7.45pm. Maria Place, Leylands Road, Burgess Hill. Details G0GNV, tal 04446 41407.
Canterbury (UOKARS) – Tuesdays, 7.30pm, Radio Shack, beside Oast Housa, near Parkwood residences. Details G4SAY.
Chichester (CARC) – First and third Tuesdays of aach month, 7.30pm. St Pancras Hall, St Pancras, Chichester. Details G4EHG, tel Chichester 789587.
Crawley (CARC) – Third Wednasday of aach month, 8pm. Crawley Laisura Centre, Haslett Ava, Crawley. Details G4IOM, tal 0293 882641.
Dartford (DDFC) – Pra-hunt meetings on Tuasdays, aftar 9pm, Horsa and Groom ph, Leyton Cross, Dartford Heath. Details G8DYF, tal Groanhitha 844467.
Dovar (SE Kent YMCA ARC) – 6 Jan (Natter night), 13 ("Frequancy counters", G3ROO), 20 (Natter night), 27 ("DX TV", G6IGI), 3 Feb (Natter night). Dover YMCA, Godwynahurst, Leyburne Road, Dover. Details John H Dobson, 145 Snargate St, Dover, Kent CT17 9BZ.
Eastbourne Electronics (EEARC) – Sundays, 8pm. Shinewater Communily Centra, Milloil Drive, Langay, Eastbourne. Details tel Sundays batwaen 8 and 10pm, Eastbourna 768614.
Eastbourne (Southdown ARS) – 4 Jan (AGM), 7.30pm. Chaseley Home, Southcliff, Bolsovar Road, Eastbourne. Classes and maatings also held every Tuesday and Wednasday, 7.30pm. Hailsham Leisure Centre, Vicaraga Lana, Hailsham. Details GIUTH, tel Crowborough 63061.
Edenbridge (EARS) – Second Wednesday of tha month, 8pm. Tha Scout Hut, High Straat, Edanbridge. Details G8VCH, tal East Grinstead 24748.
Gillingham (Bredhurst R&TS) – 7 Jan ("Phasa lock loops", G8NVH), 14 (Construction/Natter night), 18 (Slide competition, with Parkwood Photographic Society), 21 ("SWR – the facts", G3MCK), 29 (Construction/Nattar night), 29 (Friday) Christmas dinner and dance PWCA, 7.30pm. Parkwood Community Centre, Parkwood Green, Wigmora, Gillingham. Details G0AMZ, tal Medway 376991.
Gillingham (MARTS) – Fridays, 8pm. Awaiting naw meeting place. Details G1MSS, tal 0474 814874.
Gravesend (GRS) – Mondays, 8pm. The Windmill Tavern, Shrubbary Rd. Details G0DYX.
Hastings (HERC) – 20 Jan ("Cellphones"), 7.30pm. West Hill Community Centre. Various activities other evenings. Details G4NVO, tel Hastings 420608.
Herne Bay (East Kent RS) – First and third Thursdays of the month, 7.30pm. Cabin Youth Centre, Kings Road, Herne Bay. Details G4RIS, tal 0227 262042.
Horsham (HARC) – First Thursday of the month, 8pm. Guide Hall, Denne Road, Horsham. Details G4UDU, tel Hassocks 5617.
Kent Repeater Group – Sec G0AMZ, tel 0634 376991.

Lewes (L&DARC) – First and third Tuesdays of the month, 7.30pm. Bridge View Community Centre, Lewes. Details G4PZU, tel 07916 3239.
Maidstone (MYMCAARS) – Fridays, 8pm. YMCA Sports Centre, Melrose Close, Maidstone. Details G0BUW, tel 0622 30544.
Margate (Radio Club of Thanet) – Second and fourth Tuesdays of the month, 7.30pm. Grosvenor Club, Grosvenor Place, Margate. Details GIHWG, tel 0843 42480.
Meopham (MPRC) – Second Sunday of each month, 7.30pm. Virgo Rugby Clubhouse, Virgo Village, Meopham. Details G4XNU, tel 0732 823371.
Sittingbourne (Swale ARC) – Mondays, 7.30pm. Ivy Leaf Club, Dover St, Sittingbourne. Details G1JOH, tel Minster 876091.
Sussex Repeater Group – Details G8TJO.
Swanley (Derenth Valley RS) – Twice monthly, Wednesdays, 8pm. Crockenhill Village Hall, Nr Swanley. Details Mr Thomas, tel 0322 63368.
Tunbridge Wells (West Kent ARS) – Fridays 8pm. Adult Education Centre Annexe, Quarry Road, Tunbridge Wells. Details G3XPX, tel 0982 48575.
Worthing (W&DARC) – Wednesdays, 7.30pm. Lancing Parish Hall, South Street, Lancing. Details G4GPX, tel Lancing 753893.

G4VEC

CORNWALL, DEVON

While saying goodbye to Devon, I am pleased to say I will still be representing Cornwall in the future. I hope that I will not lose the many friends that I have made in the past in the east and will still keep in contact.

G3VWK

Exeter (EARS) – 11 Jan ("Dx operating and the dx station", G3HTA), 7.30pm. Community Centre, St David's Hill, Exeter. Details G3YBK.
Exmouth (EARC) – 13 Jan ("ORP operation", G4EBO), 7.30pm. Scout Hut, Marpool Hill, Exmouth. 27 (Annual junk sale), Scout Hut, Marpool Hill, Exmouth. 10 Feb (1988 AGM). Details G1GZG.
Redruth (Cornwall RAC) – 7 Jan ("Smiths Charts and all that", Simon Rodda), 11 (Computer section: "A computerised central heating system", G3NPB), 21 (Activities evening), 7.30pm at the Church Hall, Treleigh, Redruth. Details from Norman, G4USB.
St Austell (English China Clay ARC) – 18 Jan ("Wireless that was radio that is and will be", G3VWK), 7.30pm. ECC Laboratories, Penlewan Road, St Austell. Details G4OKS.
Torbay (TARS) – 23 Jan (Contest and construction night), 7.30pm, ECC Social Club, Highweek, Newton Abbott. Details G0FGX.

DYFED, GWENT, POWYS, MID, S AND W GLAM

Abergavenny (A&NHARC GW4GFL) – 7pm, Thursdays. Pen-Y-Fal Hospital, Abergavenny, Gwent. (Above Male ward "C"). Regular cw classes and dx discussion group. Sec GW4IQA, tel 0873 890681.
Aberporth (Dyfed ARS GW4SZV) – 7pm, Wednesdays. Building 17, The Airfield, Aberporth. Sec GW0DDR, tel 0239 87274.
Aberystwyth (A&DARS) – 7.30pm, second Tuesday in each month. Bay Hotel, Aberystwyth (on sea-front opposite the bandstand). Sec Mr Eric Webb, 3 Maes-Y-Felin, Llanavon, Aberystwyth, Dyfed. SY23-4BN.
Barry (BCFERS GW4BRS, GW6BRC, GW3VKL, GB2FI) – 7.30pm, Thursdays. The College Annex, Weycocks Cross, Barry, South Glamorgan. Sec GW4GSH.
Berry (RAF Saint Athen ARC GW3CKB) – 7.30pm, Wednesdays. RAF Saint Athen, Nr Barry. Sec GW0FJW, tel 0446 750277.
Blackwood (B&DARS GW6GW) – 7.30pm, Fridays. (During school terms) Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Sec GW6YYR, tel 0495 243858.
Bridgend (B&DARC GW4LNP) – 7.30pm, first and third Wednesdays in each month, Bridgend Town Amateur Football Club Clubhouse, Coychurch Road, Bridgend. Sec GW4DUY, tel 656 863084.
Bristol Channel Repeater Group (GB3BC) – Sec GW6MBU, tel 0446 711146.
Cardiff (British Rail ARC RS37562) – Contact Mr Owa Wade, 1 Lomond Crescent, Cyncoed, Cardiff.
Cardiff (British Telecom S Wales District AMC GW0LST?) – 7.30pm, second Wednesday in each month. British Telecom, South Wales District Headquarters, Corylon, Cardiff. 13 Jan ("Single sideband generation", R Millington). Sec John Foley, RS91086, N/RCS, Store, Unit 5, Stuart Close, Penarth Road, Cardiff CF1-7QF; tel 0222 28320 (weekdays only 8am to 4pm).
Cardiff (RSGB GW5BI) – 7.30pm, second Monday in each month, Pant Mawr Hotel, Tyla Teg, Pant Mawr Estate, Whitchurch, Cardiff. 11 Jan (Slide lecture "Tour of Jerusalum", GW3MRI). Sec GW0CUM, tel 04463 3212.
Cardiff (Highfields ARC GW4LFO, GW1LFO) – 7.30pm, Thursdays. Highfields Centre for the Physically Handicapped, Allensbank Road, Cardiff. Sec GW6ZHM, tel 0222 625314.
Carmarthen (CARS GW4YCT) – 7.30pm, second and fourth Fridays in each month. Communication Rooms, Goter Glas, Maesbont, Nr Llanelli, Dyfed. Sec GW4ZXL, tel 0267 231359.
Chepstow (C&DARS GW4LWZ) – 7.30pm, Thursdays. Leisure Centre, Chepstow, Gwent. Sec GW1FJI, tel 02912 2808.
Cwmcynon (CARS GW3FFE) – 7.30pm, first and third Wednesdays in each month, Celn-Pennar, Hotel, Mountain Ash. Sec GW4UAJ, tel 0685 879938.
Fishguard (F&DARS GW0AOC) – 7.30pm, Wednesdays. Radio Shack, Further Education Centre, Ropewalk, Fishguard. Sec GW3DWY, tel 0348 872671.
Haverfordwest (Pembrokeshire RS GW0EJE) – 7.30pm, first and third Thursdays in each month. Further Education Centre, Tower Hill, Haverfordwest, Dyfed. The club holds RAE and morse classes and is a registered morse test centre. Sec GW0HPO, or tel GW6ZMU, Haverfordwest 4009.
International Listenera Association RS88763 – Sec GW4OXB.
Llanelli (LARS RS87700, GW0EZO) – At an egm, it was decided to incorporate the society with the Coleshill Day Centre for the Handicapped and that aims would be to support disabled radio amateurs and swls of the area. The new title of the society to be: Llanelli Coleshill ARS, and its new meeting venue to be the day centre. Second and fourth Mondays in each month, 7.30pm. Future plans include a station at the centre which will be available for use by all licensed society members and residents of the adjacent home. It is hoped that other clubs/societies in the area will support the various activities to be held at the centre. Sec GW1MGW.
Merthyr Tidfil (Hoover [Merthyr AMC GW3RDB) – 7.30pm, Mondays. Hoover Sports Pavilion, Hoover Ltd, Pentreback, Merthyr Tydfil. Sec GW3RNC, tel 0685 5196.
Newport (NARS GW4EZW-GW1NRS) – 7.30pm, Mondays. Bryngles Community Centre, Bryngles Road, Newport. Sec GW4IEF, tel 0633 280958.
Pembroke Dock (P&D ARC GW2OP) – Last Wednesday, 7.30pm, and second sunday, 2pm, in each month. 33 Dimond Street, Pembroke Dock. Sec GW6EHC, tel 0646 686532.
Pontypool (PARS GW3RNH) – 7pm, Tuesdays. Settlement, Rockhill Road, Pontypool. (Excluding Bank holidays). Sec GW4RJA, tel 0633 372110.
Port Talbot (BSC ARS GW3EOP) – 7.30pm, Thursdays. British Steel Sports and Social Club, Port Talbot. First Thursday in each month reserved for a general meeting. Sec GW4IGR, tel 0639 720416.
Montgomery (POWYS ARC GW4HVN) – 7.15pm, Thursdays. The Cricket Pavilion, Lynmore Park, Montgomery. Sec Mr Mike Smith, GW4DWX, Tonn Marr, Bron-Y-Buckly, Welshpool, Powys. SY21-7NO, tel 0938 2068.
Red Dragon Contest Group GW8GT – Contact GW3KYA, tel 0495 225825.
Rhondda (RARS GW2FOF) – 7.30pm, Thursdays. National Union of Mine Workers Club, Tonypandy. Sec GW4BUZ, tel 0443 432542.
South-East Wales Repeater Group GB3SG – Sec GW6CUR.
South Glamorgan Raynet Group – 7.30pm, Wednesdays, Civil Defence Building, Cyncoed Road, Penylan, Cardiff. Group Controller GW4MOZ.
South Wales Electricity Board RS GW4DGB – Primarily intended for Electricity Board staff. Contact Mr N J G Little, c/o South Wales Electricity Board, Saint Mellons, Cardiff.
South Wales Police ARS GW4SWP – Primarily intended for police staff. Contact Mr TA Davies, c/o Video Department, Police Headquarters, Bridgend.
Swansea (SARS GW4CC) – 7.30pm, first and third Thursdays in each month. Lecture Room "N", Applied Sciences Building, Swansea University, Swansea. Sec GW0BBO, tel 0792 818100.
Swansea (SR&CC GW4UNV) – 7.30pm, Fridays. 3 Gloucester Place, Sec GW0BUA, tel 0792 588760.
Swansea (University College ARS GW3UWS) – Primarily intended for students of Swansea University. Sec GW3KGI.
Tregegar (LRC RC) – 7.15pm, Tuesdays. MIM Factory, Woodfield Works, North Avenue, Tredegar; Portacabin just inside the gates. Sec GW1EXF, tel 049525 6560.
West Wales Repeater Group GB3WW – Contact 7 Crofton Drive, Baglan, Port Talbot, West Glamorgan.

GW4KQ

CLWYD, GWYNEDD

Bangor (Dragon ARC) – First and third Mondays of the month, 8pm. Four Crosses Hotel, Pentraeth Road, Menai Bridge, Gwynedd. Sec GW EGT, phone contact via GW0ABL, Llanfairpwll 713647.
Caernarfon (Arfon Repeater Group GB3AR, GB3AN) – Sec GW3PIO, tel 0248 714571.
Colwyn Bay (Conwy Valley ARC GW6TM) – 7 Jan (Discussion and talk). Note meetings now first Thursday of month, 7.30 pm, Edelweiss Hotel, Lawson Road, Colwyn Bay. Sec GW0DSL, tel 07456 5529.
Deeside (Alyn & Dars) – Alternate Tuesdays, 8 pm. Shotton Social Club, Shotton Lane, Deeside. Sec GW1ILZ.
Deeside (RAF Sealand ARC GW4RAF) – E E Hewins OIC. Radio Wing No, 30 MU, RAF Sealand, Deeside.
Dolgellau (Meirion ARS GW4LZP) – 7 Jan (AGM), 4 Feb (Home-brew construction). First Thursday of the month, 8pm. Dolserau Hall Hotel, two miles from Dolgellau off Bala Rd. Sec GW3GKZ, tel 0341 422 447.
Holyhead (H & DARS) Alternate Sundays 8pm, Foresters Arms, Kingsland, Holyhead. Sec Mrs B Anziani, 12 London Rd, Holyhead; tel 0407 50577.
Porthmadog (P & DARS) fourth Thursday of the month, 8pm. Harbour Cafe, Fleslniog Railway Station, Porthmadog. Sec GW1EGO, tel 0766 2684.
Rhyl (R & DARC) – 4 Jan (Talk on fire prevention), 18 (RTTY/SSTV Demonstration), 1 Feb (The National Grid System by MANWEB) 15 Feb (Construction Night). First and third Mondays of the month, 7.30pm. second Rhyl Scout HQ Vale Road, Rhyl. Sec GW0HWK, tel Llandegla 097888 621.
Wrexham (WARC) – First and third Wednesdays, 7.30pm. Technical College, Wrexham. Sec GW4IGF, tel 0244 570212.
Welsh Language Group – Wednesdays, 1115gmt on 3,750KHz. Join the net for various discussions in the Welsh language; net controller GW2HFR.

May I wish all societies in the area a Prosperous New Year and future years. I thank all club officials for their co-operation during my years as representative for Region 11. I have decided to retire at the introduction of the new organisation of liaison officers, due to age and not being 100 per cent in health. Best 73.

GW2FLZ

BORDERS, FIFE, LOTHIAN

Berwickshire (BHAR Contest GM0DZD) – Contact GM0BPY for details, tel 08907 50492.
Berwick-on-Tweed (Border ARS) – First and third Fridays of each month, 7.30pm. St John's Hall, Church St, Berwick-on-Tweed. Sec GM1IRN, tel 0289 82491.
Dunfermline (DRS GM3IDS) – Thursdays, 7.30pm. Knock Hill Radio Station. Contact GM0DYD, tel 0383 413440.
Galashiels (G&DARC GM4YEQ) – Wednesdays, 7.30pm. Focus Centre, Livingston Place. Sec GM0AMB.
Glenrothes (G&DARC GM4GRC) – Wednesdays, 7.30pm and third Sunday in the month. Provosis Land, Leslie. Sec GM0GUU, tel 0592 744672.
Kelso (KARS GM4KHS) – Mondays 7.30pm. Abbey Centre. Sec GM4UPX, tel 0835 62656.
Lothians (LRS GM3HAM) – Club in process of changing meeting place. Sec GM4DTH.
Scottish Borders Repeater Group – Runs GB3BT, GB3HK, GB3SB GB3HK closed down August 1987 due to site costs. GB3SB: Site change to IBA Lindean still in the pipeline. Sec GM4EZJ, tel 0875 53450.

Thanks to all who have supplied me with news over the past years. With a change of QTH I have a busy time ahead and I wish the new liaison officers every success.

GM0HNX

ESSEX, NORFOLK, SUFFOLK

Basildon (Marconi ARS) – First Monday, 8pm. The Shack, GEC Avionics Social Club, Gardiners Way, Basildon. Sec G8PKM, tel 0245 323323.
Bishop Stortford (BSCARS) – Third Monday, 8pm, Royal British Legion Club, Windhill, Bishops Stortford. Sec Peter Cartwright, tel 0279 812096.
Braintree (B&DARS) – First and third Mondays, 8pm. The Community Centre, Victoria Road (next bus station), Braintree. Sec G1NBV, tel 0376 44908.
Brentwood (BARC) – First and third Tuesdays, 7.30pm, The Hermitage, Shenfield Road, Brentwood. Sec G8WYM, tel Basildon 403153 (daytime).
Bury St Edmunds (BStEARS) – Third Tuesday, 7.30pm. County Upper School, Beetons Way, Bury St Edmunds. Sec G1FUU, tel 0359 50271.
Canvey Island (SEARS) – Wednesday, 7.30pm. The Paddocks, Long Road, Canvey Island. Sec G4FMK, tel 0268 683805.

Chelmsford (CARS) – 5 Jan (Film evening). First Tuesday, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Sec G4KOE, tel 0376 83094.
Clacton (CARS) – Second Wednesday, 7.30pm. Eldorado Block, The Broadway, Jaywish. Sec tel Clacton 430466.
Colchester (CRA) – Alternate Thursdays, 7.30pm. Colchester Institute, Sheepen Road, Colchester. Sec G3FIJ, tel 0206 851189.
Felixstowe (F&DARS) – Alternate Mondays, 8pm. The Scout Hut, Bath Road, Felixstowe. Sec G4YOC, tel 0473 642595.
Great Yermouth (GYRS) – Thursday fortnightly, 8pm. Drill Hall, York Road, Great Yarmouth. Sec G3NHU, tel 0493 721173.
Harlow (H&DRS) – Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Sec G4PGB, tel 0279 722612.
Heverhill (H&DRS) – Fridays, 7.30pm, Copse Hall Farm, Bumpstead Road, Haverhill. Sec G4MVK, tel 0440 61207.
Ipswich (IRC) – 13 Jan (Visit to Sizewell), second and last Wednesdays, 8pm. Rose and Crown ph, Norwich Road, Ipswich. Sec G4IFF, tel 0473 44047.
International Police Assoc RC (IPARC BRIT G4IPA) – Sec G4TRE, tel 0277 231077.
Kings Lynn (Norcat ARC) – Thursdays, 7.30pm (Morse Fridays, 7.30pm). Rear of St James' Boys' School, Hospital Walk, Kings Lynn. Sec G4OZG, tel 0553 768701.
Leiston (LARC) – First Tuesday 7.30 for 8pm. Sizewell Sports and Social Club, King George's Avenue, Leiston. Sec G0CJX.
Loughton (L&DRAS) – Alternate Fridays, 8pm, Debden Community Centre, Loughton Hall, Rectory Lane, Loughton. Sec G4FKI.
Lowestoft (LD&PYEARC) – In abeyance. Contact G4KDL, tel Lowestoft 66289.
Martlesham (MRS) – Occasional first Wednesdays 7.30pm, British Telecom Research Labs, Martlesham Heath, Ipswich. Sec G4SYG, tel 0473 88663, (work: 0473 643317). Visitors must book in advance.
Norwich (NARS) – Wednesdays, 8pm. Valley Drive Community Centre, 79 Plumstead Road, Norwich. Sec G4RKK, tel Wymondham 606979.
Rochford (RDRC) – Second Monday, 7.30pm, Civil Defence Building, Rochford. Sec G3FGC.
Settron Welden (SW&DRAS) – Third Wednesday, 8pm, Sec G6KDW, tel 0799 22715.
Southend (S&DARS) – Fridays, 7.30pm, Rocheway Centre, Rocheway, Rochford. Sec G3YOA, tel 0268 761126.
Stanford Le Hope (SLH&DARC) – Mondays, 8pm, St Joseph's Parish Rooms, Scratton Road, Stanford le Hope. Sec G4LTH, tel 0375 674301.
Sudbury (S&DRA) – First Tuesday, 8pm, Saracens Head, Newton Green, Sudbury. Sec G1GPD, tel 0787 77004.
THURROCK (TARC) – First and third Tuesdays, 8pm. Sec G3KMD.
Vange (VARS) – 7 Jan (Junk sale), 14 (WAB, G4EZP), 21 (VDU homebrew, G3ASH), 28 (Programme discussion), Thursday, 8pm. Barstable Community Centre, Basildon. See Mrs D Thompson, tel 0268 552606
Many thanks for all the goodwill shown during my period as regional representative. Good luck in the future. *G4HMF*

Eastleigh (Itchen Valley ARC) – 8 Jan ("Low-cost homebrew panoramic receiver", G4XZL), 22 ("Wireless from the beginning", G3CBU). Second and fourth Fridays (except August), 7.30pm. The Scout Hut, Bricklield Lane, Chandlers Ford, Eastleigh. Sec G1IPQ, tel 0703 736784.
Fareham (F&DARC) – 6 and 20 Jan (Natter nights), 13 (Facsimile demonstration, G8DOW), 27 (AGM). Wednesdays, 7.30pm, Portchester Community Centre, Portchester. Sec G3CCB, tel Fareham 288139.
Farnborough (F&DARS) – Second and fourth Wednesdays each month, 8pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. PRO M C Graffius, The Paddock, Diamond Ridge, Camberley, Surrey GU15 4LB.
Gosport (Rowner & DARS) – Alternate Wednesdays (except august), 7.30pm. Searle Manufacturing Ltd, Newgate Lane (opposite *HMS Collingwood*). Sec G6NUD, tel 0703 737892.
Guernsey (GARS) – Tuesday and Fridays, 8pm. The Lodge, La Corbinerie, Oberlands, St Martins, Guernsey. Sec GU4SXM, tel 0481 25450.
Horndean (H&DARS) – First Thursday in every month, 7.30 for 7pm. Murchiston Hall, London Road, Horndean. Sec G4RLE, tel 0705 755274.
Isle of Wight ARS – 1 Jan (New Year dinner dance), 8 (Project night), 15 (Special operating night), 22 ("Choosing a receiver", G3PZB). Fridays, 7.30 for 8pm. Unity Hall, Wooton Bridge. Sec G4RGE.
Jersey (JARS) – Fridays 8pm, Sundays 10am. Le Hocq Tower, St Clement. Sec GJ6OZB, tel 0534 83722.
Jersey (JAEC) – Thursdays, Fridays and Sundays 9pm. Rozel Bay Hotel. Details GJ4ICD, tel 0534 77067 (day).
Liphook (Three Counties ARC) – 6 Jan ("GU3TUX", G3TUX). 20 ("Radio Investigation Service", David Hellows, DTI). Alternate Wednesdays, 8pm. The Railway Hotel, Liphook. Contact G4VKC, tel Liphook 723415.
New Forest Repeater Group GB3NF – For information or to join the group and help support the repeater, please contact G6DLJ, tel 0703 847754.
Plessey (Christchurch ARS) – Second and fourth Thursdays of each month, 7.30pm, Plessey Social Club, Grange Road, Christchurch. Sec G1YHF, tel 0202 486344, ext 2415.
Poole (PARS) – Last Friday of each month, 7.30pm. Commanders House, Constitution Hill Road, Poole. Sec G4XYX.
Portsdown Hill Repeater Group GB3PH – For information or to join the group and help support the repeater, please contact Mr A L G Price, tel 0329 281852.
Portsmouth (Marconi EARS) – Last Tuesday of each month, 8pm. Broad Oaks Canteen, Portsmouth Airport. Sec G3FWE, tel 0983 63806.
Salisbury (SRES) – Tuesdays (except August), 7.30pm, Grosvenor House Centre, Churchfields Road, Salisbury. Sec G4LDR, tel 0980 22809.
South Hants (SH International Telegraphy Society) – Thursdays 7.30pm, The Community Centre, Malins Road, Portsmouth. Sec G3JZV.
Southampton (SARS) – First and third Wednesdays of each month except August, 7.30pm. Millbrook Community School, Green Lane, Southampton. Sec G4VKB, tel 0703 737892.
Southampton (SUARS) – Wednesdays (during term) and 7.30pm, 65 University Road, Southampton. Contact G0ERI, tel 0703 559122, ext 2137 (work).
South Dorset Repeater Group (GB3SD and GB3DP) – For information or to join the group and help support the repeaters, please contact G3VPF.
Swindon (S&DARC) – Thursdays, 7.30pm, Oaklield School, Marlowe Avenue, Swindon. Sec G4YOZ, tel 0249 890303.
Trowbridge (T&DARC) – 6 Jan (AMG), Alternate Wednesdays, 8pm, Territorial Army Centre, Blythsea Road, Trowbridge. Sec G0GRI, tel 0380 830383.
UK FM Southern Repeater Holding Group GB3SN – Results of recent AGM: Chairman, G1VEX; treasurer, G1CEI. For information or to join the group and help support the repeater, please contact Mrs Carolyn Wood, tel 0962 51362.
Waterside (WSWC) – 26 Jan (Bring along theme – Old components). Fourth Tuesday in each month, 7.30pm, Community Centre, Blacklield, Southampton. Sec G0BPA, tel 0703 893937.
Wessex (W Ameteur Wireless Club) – Alternate Tuesdays, 7.30pm. Poole Logic, 49, Kingston Road, Poole. Sec G6SDQ, tel 0202 822125.
Weymouth & Portland (SDRS) – 5 Jan ("Basic nuclear systems", G4DLE). First Tuesday in every month, 7.30pm. The Pensylvania Castle, Portland, Dorset. Sec G0FIT, tel 0305 67596.
Wimborne (FRARS) – Sundays, 7.30pm. Flight Refuelling Social Club, Merley, Wimbourne. Sec G0CDY, tel 0202 872503.

Winchester (WARC) – Third Friday every month, 8pm. Dumgate house, Durngate, Winchester. Sec G1XCT, tel 0962 880605. *G3KWU*

IoW, CHANNEL IS, DORSET, HANTS, WILTS

Andover (ARAC) – First and third Wednesdays of each month, 8pm, Wolversdene Club, Dana Road, Andover. Club not, 8pm. Tuesdays S18, G0ARC/A. Sec G0AMO, tel Andover 51593.
Basingstoke (BARC) – First Friday in every month, 7.30pm, Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G1WKK, tel 0256 476232.
Binstead IoW (BARS) – Mondays, 7.30pm. Bricklields Horse Country Centre, Newnham Road, Binstead, Isle of Wight. Please contact sec for directions to Island Morse Test Centre. Sec G4VJF, tel Ryde 66298.
Blackmore Vale (BVARS) – Second and fourth Tuesdays of each month, 7.45pm. The Bell & Crown, Zeals (on the A303). Sec G4YXX, tel 0963 32389.
Bournemouth (BARS) – 15 Jan (Programme for 1988). Results of AGM: Chairman, G3VPC; Treasurer, G4DJG. First and third Fridays of every month, 8pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4DJG, tel 0202 526793.
Chippenham (C&DARS) – Tuesdays 7.30pm. Chippenham Sea Cadet HQ, Chippenham, Wilts. Sec G4GFJ, tel 02214 4190.
Devizes (D&DARS) – Fridays, 8pm. Devizes Town Football Club, Nursteed Road, Devizes. Sec G4VUO, tel 0249 651471.
East Dorset UHF Repeater Group (GB3DT) – For information or to join the group and help support the repeater, please contact G1VIP, tel 0202 735003.

LONDON N OF THAMES, HERTS

Cheshunt (C&DARC) – 6 Jan (Natter evening), 13 ("Weather satellite reception", G4OAA), 20 (Natter nite), 27 ("SSB basics, G3TIK). 8pm. Church Room, Church Lane, Wormley, Cheshunt. Jim Ware, 4316.
Chiswick (ABCARC) – 19 Jan (AGM), 7.30pm. Chiswick Town Hall, High Road, Chiswick, London W4. Sec G3GEH, tel 01-992 3778.
Edgware (E&DRS) – 14 Jan (AGM), 28 (Informal, Station on air). 8pm, Walling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. More info from Jackie Colnell on Garston 672711.
Harrow (RSH) – 8pm. Roxleth Room, Harrow Arts Centre, High Road, Harrow Weald. Sec Josie Jenkinson.
Harpenden (HARC) – 7.30pm. Silver Cup, St Albans Road, Harpenden, Herts. Sec G1BJC, tel 0582 72455. Also S22 1930 net every Tuesday.

Continued on page 74

CLEVELAND, DURHAM, NORTHUMBERLAND, TYNE & WEAR

Berwick (Bordera ARS G0BRS) – First and third Friday evenings. St John Ambulance Brigade Hall, Church St, Berwick. Sec GM11RN, tel 0289 82491.
Bishop Auckland (BARAC G4TTF) – Monday and Thursday evenings. Travellers Rest Pub, Evenwood. Contact G0FBK, tel 0388 606819.
Blyth (BARC G4VKY) – Wednesday evenings. Community Centre, Warwick St, Blyth. Sec G0ACR, tel 0670 827585.
Cambois (Wensbeck ARA G0FNQ) – Tuesday evenings and Friday afternoons. The Antenna Farm, Colliery Baths, Cambois, Blyth. Information from G4NAX, tel 0670 818442.
Consett (Derwentside ARS G4PFQ) – Wednesday evenings. The Steel Club, 36 Medomsley Road, Consett. Sec G3KMG, tel 0207 504198.
Corbridge (Tynedale ARC G4DNQ) – First Tuesday evenings monthly. Corbridge Club, St Helens St, Corbridge. Sec G1T1K.
Darlington (D&DARS G4ZVH) – Friday evenings, 7.30pm. Hurworth Grange, Hurworth, Nr Darlington. Sec G6PRV, tel 0325 460528.
Durham (DARS G4VTV) – Friday evenings. Golf Club, Mount Pleasant, Durham City. Sec G0AGG, tel 091 373 1487.
Durham (UoD R&ES G4DUR) – C/O Mr Puddephat, Grey College, South Rd, Durham City.
Easington (EARS G4APN/G6APN) – Thursday evenings. Masons Arms, Easington Village. Sec G0EOJ, tel 091 527 0745.
Great Lumley (GLR&ES G4EUZ) – Wednesday evenings. Community Centre, Great Lumley. Sec G4MSF, tel 091 4693955.
Hartlepool (HARC) – Monday evenings. Grenge Road, Methodist Church Hall, Tankerville Street entrance. Sec G4SHJ, tel 0429 87419.
Hetton le Hole (Houghton le Spring ARC G1NMD/G3NMD) – Wednesday evenings. Hettondowns Hotel, Helton. Sec G0ABF, 091 5844673.
Morpeth (Northumbria ARC G4AAX G6AAX) – Thursday evenings. Old Telephone Exchange, Cresswell Rd. Ellington, Morpeth. Sec G0EVV, tel 0670 513026.
Newcastle (NER&CC G4YPT) – Monday evenings, Village Hall, Hazelrigg, Newcastle. Sec Mr T Chilton, tel 091 2855107.
Newcastle (Tyneside ARS G3ZQM) – Wednesday evenings. Scout Centre, Harbottle St, Byker, Newcastle. Sec G4KOT, tel 091 2341148.
Redcar (East Cleveland ARS G4CRS) – Friday evenings. RAFA Club, Newcomen Tce, Redcar. Sec G1VLG, tel 0642 219586.
Shildon (Aycliffe ARG G4ZKZ) – Tuesday evenings, 29 Wallas Road, Shildon. Sec G4OHZ, tel 0325 314638.
South Shields (South Tyneside ARS G3DDI) – Monday evenings. Marine & Tech College Club, South Shields. Sec G4XWR, tel 091 4543955.
Stockton (S&DARG G4XXG) – Wednesday evenings, Billingham Community Centre. Sec G0EJX, tel 0642 555923.
Sunderland (SARS G4LPK G6BXJ) – Monday and Thursday evenings. The Brewery, Westbourne Rd. Sec G0ASM, tel 091 5288079.
Teeside Repeater Group GB3TS – Sec G8MBK.
Tyne & Weer Repeater Group GB3TW – Sec G8YWK, tel 0385 45425.
Washington (W&DARC G4YGW) – Sunday evenings, Oval Community Centre, District 12, Washington. Sec G4YGF, tel 091 4173483.

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TR10 2500, case, speaker mike, base stand. Mint £180. G3ZOL, tel: 0206-869334.

HYGAIN TH3JR, £190. DAIWA rotator 7600R with controller, £110. J-Beam 5 element cross YAGI, £20. All items cash. Buyers collect. G3CVV, QTHR. tel: 0732-353360.

14 Element PBM VHF parabeam with mast and cable, £55 ono. KR600RC rotator and control box, £150 ono. All vgc. Must sell due to commitments. Tel: Deeside Clwyd 822798 (evenings).

HEATHKIT amateur bands RX HR-10B with manual, £45. HFS trap vertical antenna, £35 ono. G4JPQ, QTHR, tel: Stowmarket 613870.

TWO COULD 10 amp 12v psu. New, unwanted present, £55 each or £90 the pair. Alan, G1GWW, QTHR, tel: 0865-820553.

YAESU FT708R, £165. Trio TR7850, £210. Standard C7800, £150. Jaybeam C5, £40. Apple + monitor, £60. WANTED cheap, 2m and 70cm FM/SSB rig also a telephone ans. M/C. Tel: Dennis, G6HKO, on Upwey, 0305-814196 (evenings and all weekends).

YAESU FT757GX as new boxed etc.FP757 Power supply, Amcomm 9000 atu, morse key and swr meter. Must sell urgently. All hardly used. Offers. Best secures. Return to student life forces sale. Contact GOFFR, Alistair Hamilton, Tel: (0225) 318741 (evenings).

YAESU FT290R mobile/portable 2m multimode, mutek, up/dn mic., nicads, mobile bracket, soft case, carry strap, rubber duck and manuals, £250 ono. G4UMP, QTHR, Tel: Gary (Southend-on-Sea) 0702-231247.

LOUDSPEAKER UNIT (49"x15"x20") Incorporating Goodmans 301 (12"), Midax 650 (mid-range) and Trebax (tweeter) loudspeakers, plus two attenuators, ARU172 and crossover network, £50 ono.G0HRH Tel: 0625-72062. Buyer collects from Macclesfield.

FT290 Carrying Case, charger, nicads, unmarked, little used, mint condition, £275 ovno.
tel: 01-391-0514 (evenings). QTHR. CODE or GOOG frequencies 144-146.

COMPLETE 23cm STATION, MMT1296/144S 2x2C39amp, 4x23clr. tonnas, stacking frame pre-amp. Kenwood SM220 monitorscope, BSR panadaptrr. FT290R mobile mount, 25w amp. Commodore 64 bits. Com-1n board MP5802 printer, mouse, etc. Kenwood cw filters, YK88C, YG455C. Datong FL3. Offers. G4NQC, QTHR. Tel: 01-697-3250 (evenings).

MUTEK FT290 r/w case, charger, etc. £265; MM 70cm transverter (rsrd) £100; MM, 2M 30w linear £50; 9M telescopic mast (unsrd); £45; MSX computer c/w 3.5" disc drive, word processor, etc. £250. SAE for full details. G8QQN, QTHR. Tel: Portsmouth 750600.

KENWOOD STATION Monitor SM220 with PAN adaptor, £250. G4YBR. TEL: Southend-on-Sea (0702) 552729.

F/B MOBILE Antenna. New unrsed, £19. Hy-gain vertical antenna model 18AVT-WBA. Cost £74. In good condx. £40. Tel: Howard, G0HZH, 0394-460474.

FT101B, £200. Trio R-1000 receiver, £175. CBM3032 computer basic 4 roms + commando toolkit and mikro assembler fitted, £200. Single disc drive 203TLP £300. CBM data recorder, £30. All with manuals. Additional programming books. Details on request. G3VLL. QTHR.

FT77 With FCM board and marker unit, plus FC700 atu, £475. FT790 matching FL7010 10w linear and mobile mount, £325. Both ovno. G6UGI, QTHR. Tel: Royston 0763-43570.

YAESU FT102. New PA valves recently fitted. vgc. Also matching MD-1 microphone. Both complete, £500. G4SBH. QTHR. Tel: Torquay, 0803-34640.

IC215 2M FM PORTABLE transceiver 15 channels with nicads and charger. Original packaging, little used, £119 ono. G8LHQ, QTHR. Tel: 01-735-0762.

TR10 TS430S, £695. PS430, £100. Kenwood AT230, £160. All hardly used. RT000, £795 ono. Also offers for weston anyliser E772. Farnell stabilised voltage supply E350. TX MEL G11 receivers R210, RT018, R1017. G3CQU, QTHR. Tel: 01-660-5474, (evenings, weekend).

YAESU FT757GX, FC757AT, FP757HD, as new, 6 months' importers guarantee, £990. Part exchange good CCRX. Also FT208R H/H base charger/psu spkr/mic 2 spare battery packs .25 wave whip, £150. Tel: 0625-530200 (Garry - near Manchester).

ROTATOR AR40 suitable for light weight beam. With 20m control cable. Three months use only. Buyer collects, £70. GM4CUX, QTHR. Tel: 031-339-5092.

TELEREADER CWR85E. Send/receive RTTY cw BAUDOT and ASCII. Bargain, £300. Barratt, G4CHG, QTHR. Tel: (Torquay) 0803-37050.

COLLECTORS ITEMS for sale: OST 100 MK3 dual conv. superhet with regen rf stage. Date stamped 1941/2. Original handbook. H/B psu £85. HRO with 7 coil packs. H/B Spkr/psu, £65. G4WJX. Tel: Martin, 0782-330613.

ICOM IC271E 2m base mutek front and 25w 32 memories, 2 VFOS. Immac., £600 ono. WELZ SP420 swr/power meter 140-525 MHz, £30. G1HZS, QTHR. Tel:(Melton Mowbray) 0664-64287.

YAESU FT709R, speaker mic. £159 ono. Quad 40S Mk2 hi-fi amplifier (2x100w), quad 44 control unit, £485 ono. Phillips CD304 CD player, £209 ono. Olympus OM2N 50mm/f1.8, £139 ono. Vivitar (om) 75-205mm zoom, £49 ono. G4WVX. QTHR. Tel: Brrcs, 06286-64475.

KENWOOD TS120S rsrd mobile, in good working order, £200. R1000 Gen coverage receiver, £200.Excellent condx. G4GIR. QTHR. Tel: 0525-403431 ext.3226 (0800-1600 gmt) Ask for Mr. Ian Frith.

R209 RECEIVER 1-20MHz coverage, vgc, £50. Roland SHT01 synthesiser vgc, £100 ono. WANTED: Racal 967 portable tcvr in gr, atu and linear to match KW2000 rig and info on dynamare 07T00 'scope. Tel: Stuart, 021-743-7425.

YAESU FRG7 RX immac. condx. + 2MTR cvtr. + manual, £100. G4RLU. QTHR. Tel: 01-997-4452.

AMT1 AMTOR RTTY CW including cw transmit option, all leads and software for BBC micro, £110. ICS radio modem RMT unrsed, £40. Telebox 2 converts RGB microvitor crt to high quality colour TV, £45. GOAKN. Tel: 01-891-2820 (eves.)

MICROWAVE MODULES MMTT296 TVTR with attenuator and 23EL tonna, £215 ono. Buyer collects. G4LLI, QTHR, West Sussex. Tel: 0403-56478 (after 7 pm).

TONOTHETA 5000E terminal unit. Brit in VDU with keyboard etc. used recelve only approx. 2 hrs., £800. Trio 9130 multimedr + mount vgc, £350. YAESU FRG9600 withers Mk3 unused, £475. Dressler ARA500 active antenna unused, £90. BNOS linear LPM144-T0-180 unused, £275. Datong ANF, mint, £50. Hamgear PMX unrsed, £60. Drill desk mic 5M5, rnrsed £30. Hansen FS603M rhf swr/watt mtrrr, £25. YAESU YM48 mic, mint, £15. G6SFO. Tel:0246-413413 (evenings/weekend).

YAESU FT221R all mode 2mtr tcvr in vgc, £350 ono. Also h/h ALM203E spkr/mike, dc/dc con. 30 w/e, soft case, charger nicad pack, less than 10 hrs. use, rest £374, sell £220. G3WHQ. Tel: (Grimsby) 0472-813370.

TR10 R2000 gen/cov rx; good condition, boxed, h/book, £425 ono. Buyer collects. Tel: 0291-690507 (evenings/weekends).

CLARK SCAM 40' air mast with grys, field legs, pump etc., £500. Hygain TH6DXX new in box, £500. TH2Mk3 good condx, £90. YAESU SP90T, £20. 10a power supply, £30. Tempo 2002 2m Tkw linear, £750. G3XNH. Tel: 095389-8376.

TR10 9130 2m multimode box, manuals, bracket leads ex.condx. £335. AEA/IOS 'computer patch' cpl rtty terminal unit with G3WHO BBC software, £135. Wanted: Trio/Kenwood hf linear, must be good condx. with manual/box. G4XNF. Tel: 0293-51520T.

YAESU FT102 FM/AM, SSB filter, new gen.elec. valves, YM35 mic, FV102 external digital memory VFO, full technical manuals, vgc, £650 ono. G4UVQ. QTHR. Tel: 0462-674437.

YAESU FRG9600, mint condx with hf converter (internal). Cover's 100KHz-950MHz c/w manual, £395. G40BX. QTHR. Tel: 0270-71369.

TS830S AT230, vgc, £775. TS780, also vgc, £675. G1JIP. QTHR. Tel: (Northampton) 0604-847924.

YAESU FT225RD, tcvr. Fitted memory unit and fixed frequencies. Mint condx, boxed, £495. ICOM 505 FM fitted, mint, £325. Liner 430 70cm 10w tcvr. usb/lsb/cw as new, £95 ono. Liner 2. 2mtr tcvr. preamp, £70. Liner 2 for sparrs, £10. SP4 Speach processor, £20. MM 2mtr/70cm tripler, £15. MM 70cm/10mtr rx/conv, £12. MM 4mtr/10mtr rx/conv, £12. 17 ele 2mtr tonna, £20. Trio 2200 2mtr FM tcvr, £50. MML144/100HS linear, 6 months' old, £100. G60UN. Tel: 0202-479038.

YAESU FT101B fitted cw filter handmikr, handbook, spare set new valves, Heathrilte mobile mike, £300 ono. DAWA CM620 swr meter, £45. G4ZOF. QTHR. Tel: (Radcliffe-on-Trent) 060-73-3313.

8601 WAYNE KERR RF bridge 15KHz to 5MHz, with instructions, £35 ono. G3GIQ. QTHR.
Tel: 01-567-6389.

TR10 TS830, about 25 hrs use since new. Mostly listening, fitted extra 250KC cw filter as new, £750. VFO120, £50. Original manuals and packing. Prefer buyer inspect. Collect or carriage at cost. GW3CBA, QTHR. Tel: 0446-741520 (anytime).

REGENCY SCANNER receiver model no.MX7000 25-1.2GHz coverage. Very little used. As new, £325 ono. Tel: 0227-375168.

RECEIVER TYPE AR77E, good working order. Inc. FM detector module, 0.5-30MHz, £15.
WANTED: Eddystone 888 receiver or EC10 in excellent condx. GW0GHF. QTHR. Tel: (South Glamorgan) 0222-703429.

FT101E TX/RX FAN. Cw filter. Handbook. Excellent throughout, £380 ono.G2CYN. QTHR Tel: 0234-711538.

TWO 4CX250B BASES with PTFE chimneys, £30 pr. Microwave modules MMT432/144R 70cm transverter c/w 15db and 7db attenuators, £130 ono. All gwo. G6WXZ. QTHR. Tel: (Adrian) 0375-679042 (evenings).

COMPLETE HF/VHF Station. Valued at £3,600+. Would exchange for Wersi Beta Organ. For list of equipment tel:0923-244069 (after 7.30 pm).

10P0 IS1305 with DFC230. Mobilr brarkrt. All perlert condx wlth both mlrs, £550. No split. G4MCL. lel:(Davr) 061-724-5770 (lravo mrssage on answrrphonr. I will trlephone bark).

TEXAS 1199/4A COMPUTER with rxtrnded baslr, prrsonal rerord krrpirg and report modrles, plus kantronlrs interlarr (tr) end hamsoft modrle lor rtty, rw and ASCII tx/rx, £175 ono. G3DWG. OTHR. lel: 0772-53010.

HOKUSHIN HF5 vertlral antenna r/w radlal klt, 10-15-70-40 and 80m ln good rondx, £75. Will dallvrr reasonablr dlstarra. GOFOX, not OTHR. lel: 0908-667250.

1R10 7930 2m FM mobile base 25-2w scanning control lrom mir ln rx. rondx. No mods r/w lold-down grttar mount antrnna, rost £350, selling £200 + rarrlagr. G3MLP, OIHR. lel: (Prtrrborough) 0733-63851.

YAESU FT727R dral band hand/held.5w out. lhrre months' old, mint rondx, £300, or swep TS9130. Hrst be mint. COFIO. OIHR. lrl: 0204-657410 (evenlngs).

ICOM FL70 2.8KHz wldr lllter, £20. SWR25, swr/pwr meter, 3.5/150MHz, £7. Drmmy load 25W 3.5/500MHz PL259 plug. £5. Trleradlo 146 ordlo genrrator battery drlven 10HZ/100KHz, £10. Hoathklt AV3U valvo voltmatrr 0.01/300v, £10. FDK multl 11 2m transralver 1/10W 21 channals all repeatrrs, mobile mornt, h/b, 5/8 antenna with grtter mornt, £110. MML144/100S, 100W linear, £100. Arak 5/8 2m rollnear r/w pole rlamps, £10. C3RDC. OTHR. lel: 01-455-8831.

CBM 3032 COMPLETE with dlsr drlves, prlntor splitscreen amtor/rtty (requlrrs ST5) parket terminal emulatlon, r/w tx/rx, word processor and more. Clrrrlt dlagrams for TU lnterfares. Ex. rondx. £220. Also varsatower S sortion 50', £325 ono. C40AK. lol: 0903-892391.

IIITACHI OSCILLOSCOPE, modrl V223 as new. DC to 20MHz, 4" arraen, rost £600, opan to offers. Brem! frequency rounter model BR18600, offars. G4RCR. lrl: 0926-58563.

ICOH IC02E 144MHz lm transcelvor c/w power park, chorger, .25, .5Ω wave tolerople whips ln mint condx. Rarely used. Boxrd, £185. G4VZV. OTHR. lel: 0226-766627.

FI101ZD Ex. condx. c/w 12v park, spare PA valves, £425. Also FT290 mrltlmode 2m c/w mobile mount, £235. WANIEO: 2m transvertar like MM1144 128. C3R1R. OTHR. Tel: Arkerkey, 04555-4522.

5WAN 350 HF transcolvor. 400W PEP, £225. KW E-Zee match oto £35. Naw palr 4Cx250B EIMAC in sealed contalnors, £90. G3AWK. QTHR. Tel: 0522-753136.

FT102 am/fm new IF unlt, new tubes, recont ovarharl, lovely porformor, £550. FL2100Z mint condx. Hordly used, £550 or £1000 thr two. Bryer tests and collects. RS90576. Trl: John (Southampton) 0703-814210 (mornlngs/evenlngs).

FT780R 70CM, £330. IR9000 2m, £315. 10W multlmodes manuals, mobile mounts. MML432-50W 70cm llnear, £110, 10NO HR-150W 2m llnrar, £120, manuals, boxes. SMC 3x5/8 mobile ro-linear, raw, £18. Apple 2 + mlcro, dlsk drlva, amaterr soltwarr, paddles, £300. All vgr. Tel: Brrre 01-995-4965.

1R10 15130v, two ssb lllters, WARC, bands. MC35s mlr. h/b. power lead. perlert working order, £300. BNOS psu 13.8V 6A now boxed, £50. Welz SP220 swr pewrr metrr, new boxrd, £50. GOAES. OIHR. Tol: Rlrhardson, (Maldstone) 0622-685443.

DRAE VHF WAVEMETER, never usod, £9. Kenwood hradphomes, also never used, £5. G6IWC. Tel: (Southend) 0702-335782 (anytlmo).

ALINCO EN400 rotator (bsll type) wlth ozlmrth control, as nrw, £60. Datong morse trtor, £35. 10m vrrtlral, £8. Prefer bryer lnspact/rollect or plus carr. WANTED: 100W cheapl drmmy load. GOHYR. QTHR. Trl: 0827-57742.

IS750 2m·70rms, all modrs, £550. FT270, £150. FT757, £550. IM401, £130. FL7000, £900. KLM160 2m linear, £95. MM432/50, £75. Telrrradrr 685 modded lor amtor, £350. PK232, £170. TNC200, £90. PK87, £100. AMT2 (no manral),£80. Hrtror 1000, £150. lelegripmrnt scope, £90. Narronl signal grnrrator 1.5-220 megs, £100. 88C 8+ oprs d/drlvr, £275. Some othrr items going ORT, rall lor drtolls. Terms cash, callers only. Tel: (Chlrbrstrr) 0243-771691 (weekends, 1600/1800 weekdays).

FT290R, PIPTONE, hrllrrl, strap, soft case, mlcrophonr, manual, 2.2AL nlrads, constant rurrent rhargrr, boxrd, vgr, £250. G3LIV AMTOR/RTTY INTERFACE, + G3WHO softwarr - all yor nred to make yore BBC Mlrro e sophistiratrd amtor/rtty terminal £100. C41AC. lel: Tlm, 0272-799910 (x 24019).

IS1025 100W, 80-10m, trvr, r/w lllter, vgr, £310.

IS102S 700W, 80-10m, trvr, r/w lllterr, vgr, £310. F1208 2m hand-held + blts, £110. GOCHS. Tel: 0734-788032.

TR3500, 70CM h/h programmablr sran, rtr. r/w rase, sprekor mir.,rharger, two hrllcals, £200. TE18EL 5wlss quad yagl 2m, £20. G4WMII. OTHR. lrl: 021-705-0488.

YAESU FT790, no mods, £275. Allnro ELH730G 30W amplllirr, £50. Raral RA117 rerelver with RA218 aldrband rorvrrtor and selartor protrrtor unlt lr rark with marral, £350. All ln vgr. GOCMM, OIHR. Bryor rollerts. Tel: 0774-724130 (aftor 6 pm).

KENWOOD 1R8400 70cm FM mobile with PS10 basr stotlor psu, £250. lrom IC245E 2m multlmodo mobilr £200, G3ZSS. Not OIHR. Tol: 0932-63552 (evenings).

FREE 10 rollartor, two rrrrd 454 r/w gerf'rs and readrrs. Olfers lnvited lor HW32 tx/rx valves, brand new rnrsrd, boxed, two palrs 6GE5, two 12BY7A, 11ve 6EAB, two 6E88, G3LYU. OIHR. lel: 0533-876459.

TR9130 MULTIHOOE ln orlg. box with all arrs. £325. Kenwood base mlkr MC60A, £30. DAIWA 144MHz linear amplifior model LA215S 60W/100W out, £150. Will sell srparate or thr lot for £495. G1CCX. Tel: Stan, Nsphill, Brrks 3626 (alter 6.30pm).

TR9130 MULTIHOOE ln orlg. box with all arrs. £325. Kenwood base mlkr MC60A, £30. DAIWA 144MHz linear amplifior model LA21S5 60W/100W out, £150. Will sell srparate or thr lot for £495. G1CCX. Tel: Stan, Nsphill, Brrks 3626 (alter 6.30pm).

YAESU FT775 Tranarelvar, mobile 9-band + FM solid stote, digital readout, nevor usad lor transmlttirg, lmnar. orlginal parking, manral, £395. CA2PA, QIHR, May take 2m h/h in p/ex. lal:(Coshom) 0705-370576.

1R10 1M201A 25W 2m FM. 6 months' old. Base rse only. Boxod with all arcs. and leads, £225 or ollrrs. WANTED: Belcom F51007P. C4RUS. QTHR. Tel: 085885-343

FT726R. 70/2/5AT ex/ron. £900. Puma (Jap) 400W valve linear ssb/FM, £450. Illtovor trle/mast 2x20', £170. KR2000 ox/hoavy duty rotator 250kg vrrt load, £350. 100m 4-core rabla, £50. 2m 17 ole beam, £40. 2x70rm beams, £10. G1PDY. Tel» (Pote) 0584-890136.

KW202 RX + MANUAL, vgc, £100. BC221 frog. matar + psu, £15. Ferrograph aarlas 5 tapa rocordrr, £20. Trktronlx 109 pulsr generator, creed 75R teleprinter, UKI01 computor, oflars? GOAMS. Tel: (Androw) 0329-42664.

ICOM IC735 HF trvr, orlginal box, instruction manual, only used lor tvtr. Mint condx, £775. Hutek 1VVF144a 10m/2m tvtr model 14066, boxed + manual, vgc, £180. Belcom L5202E 2m sab/FM h/h all extras, vgc, £175. Drao 24A pau, £75. Dressler 0200C 2m 150W amp. lnt. psu £150. Talereador CWR 610E rw/rtty docoder, mint condx. £100. C1JOU. QTHR. lel: (Dortlord) 0322-75275.

ICOM IC3200 dral band trvr, lartory fltted with UT23 volra synthesizer, £375. IC271 all mode 70rm tcvr £700. Both are unused purrhases, tested only not put or elr dua change ln OIM. GOIIE. lel: John (Northampton) 0604-881971.

FT790 NICAOS rharger, soft case, helical, £240, MML432/20 linaar pro amp, £80. Scopax 4D10B dual trare solid state srope 10MHz, £120. Printer suits Oragon BBC lead llttad, spare lrk ribbon cassetto, £16, G3BOK. OIHR. Tal: (Towcastar) 52309.

FT780R 70CMS multimode, £310. TOHO 70cms 45W lineor, £40. KR500 elevation rotator, £40. CODLR. OTHR. Tel: 0732-823483 (evenings).

FT200 good flrst HF rig, £150. COCBU. OTHR. Tel: 04024-45135.

APPLE II Europlus romputer 48k, with 2x5.25" dlsk drlvr, 80 rolumn rerd (vldrx), 280 card, 16k RAM expanslon, parallrl printrr i/f with 16k briler, enhanred keyboord nroder (vldrx), 12" grern scrorn monitor, manuals, £400. C6ORU. OTHR. Tol: Patrick, 021-472-5676 (evrnings).

FT780, £310. F1290 + mutrk, £240. 100W 2m BNOS linear, £75. MM1296·144 tvtr, £150. KW2000E, £190. Major M360 ronverted mrltlmodr 10m tcvr, £80. All good rondx. Carrlage extra. GOFQA. QTHR. Tel: Tony (Wrllingborough) 0933-673642.

TET MV3-8H 3-band vrrtlcal £20. YAESU FF501DX low pass lllter, £15. Homebrew Grrtls kryrr, 0-50 wpm £10. Ml-mound squerze key on hesvy metal base, £15. Bryrrs collert/pay rerrlage all items. C4SOK. Trl: Prtrr Martln 021-429-7141 (olfice hours only)

KW2000 TCVR. 160-10m + 10MHz r/w orig. psr, lnr. handbook, rlrruits, updatr rotrs for mods rtr. £60. Hrothklt RA1, 160-10m rx with handbook and rlrcult dlagrams, rtr. £25. Bryrr collerts.

C3VZP. OIHR. Trl: 0538-753627.

MM 23rm 1V1R, MH11296/144G, 2W r/p, g/let rf, rhecked at makers new surplus to rnqts. h/brew rompletr, £180 ovne. G8AAP, OIHR. lel: 06582-2557.

YAESU FIOX500 HF trvr, 80-40-20-15-10m + spara frr two morr bards. Optional rw lllter llted, vgr. Srveral spsrr valvrs, £19G. CGDOL. Not OIHR. Trl: Harry, 0274-634084 (wrrkdays), 0388-834270 (weekrnds).

DATONC 070 morsr trter, prrrrhasrd Argrst, passrd morse test llrst time, £45 ono. G8DYV. OIHR. lrl: Chris, 04022-50307 (evenings).

RACAL RA17L, £250 lor two, one working other rrqrirlrg ettrntlor. Some spare valvrs avallablr. Will rxrhange For genrral roveragr HF rommunlration rx. G3FNJ. OTHR. Trl: 01-866-4680.

SONY ICF2001 exrollrnt gonerol rovrragr porteble synthesizrd rommunlrations rrrrlvrr FM/AM/SSB/CW 76·108MHz, 150-29.999KHz, £110 ono. Maplin LH05F translstor testrr, £10. Naplir YB82D LCR bridge, £15. All gwo. G4C5C. QTHR. lrl: Stalnrs 51898.

FRC9600 SCANNING rorrlvrr, 60-950MHz, new Feb.87 hoxed with manual, melrs adaptor and revro disrone ertenna, £375. AR22 140-149.995MHz h/h rerelvor with rhargrr, £50. SR9 2m rerelver with molns adaptor, £25. Cash. G6HIH. OIHR. lel: Brlan, (Hsmpshire) 0256·881021 (evenings).

REALISTIC OX302, 10KHz-30MHz rx. AM/CW/SSB. Olgltal display + 240/12v, lnrlrding owners msnral. Good rondx, £125. Completr set of srvar volumes Radio & lrlrvision sarvlring. Hodels prr 1953-58. Hard bark. Offers ploase. COADH. OIHR. Tel: (Wollingford) 0491-38381.

ICOH IC21SE FM, 2m portablr IS rrystalled rhannels, nleads, mobile mornt, £75. Tel: (Portsmouth) 0705·595739.

YAESU FRC7700 CEN/COV rx. memory, FRA-7700 actlvr antenna, phones, lnstrurtion manual, maintonanre servlre manual, £240. C1010. OIHR. lal: Burgess Hill 42122.

YAESU FC757 ATV, vgr, £255. Tonna 13 ele portable es new, too lorge for OTH, £25. 10 omp psu advance electronlrs, £15. londy stereo mike, brand nrw, £12. Wanted: AV0 valve manual. COECB. OIHR. lel: 0980-862681.

MODEL 100 COMPUTER, 32k dlsr/vldro lrterlace, monitor, powrr supply all lrads lnr. commercial & homebrew ROM dlsc and cassrtte soltware, £395. W52000 Modom, £90. All items boxed as new. C6IBC. QIHR. lell John, 01-790·8163.

STANOARD C5800 2M multimode, 25W boxed, e/w remote car mlc. and mobile .75 wave whip. All excellent, £320. Rotator, £20. Rf, psu, 20A at 13.8v 'advanrr' new, £75. C1USO. Hot QIHR. Tel: (Rossandale) 0706·217407

ICOM IC490E, UHF all·mode, as nrw, £400. G6YVS. OTHR. Tel: 0427-616977.

INTEL 8271 IC for BBC dlsr interlare, £40. EL fnstruments PG1 pulse generator lreq. 1Hz-1MHz pulse width 100ms·100rs 110v AC eosily modded to 240AC, £25. Hunts rrsistance capority bridge, £10. G3BOK. QIHR. Trl» Towcestrr 52309.

RS232 TERMINALS (VDU) ldral lor use with perket INC, £20. C6MNI. OIHR. lel: 01·950·0647.

IC202E 2M SSD TCVR, carry strap, handbook, hloep tonr rnlt, nleads, chorger, ex.rondx, £130 ono. Belcom liner 2, handbook, brackrt, vgc, £60 ono. G6TNX. Not OTHR. Tel: (Chelmsford) 0245-351795.

RTTY. SUPERB ST5 + full RS232 lnterfarr, tuning meter, three shifts, arto PTT rrlay, allows teleprinter to br used as rompatrr printer, winnrr SARC construrtion rontrst, £55 ono. C4P1K. QTHR. Tel: 0742-864451.

LAR NOISE bridgr, SCOKHz-200MHz ln orlg. box with drtails of practlral applicotions, £30. Datong morse tutor, model D70, £25. Azden external spraker frog. 300Hz-2.500Hz lmp. 8ohm, £15. G1CGX. Trl: Stan, Naphill, Bucks, 3626 (aftrr 6.30pm).

APPLE II Comprtrr, twln disk drives, monitor, remtronlrs printer, soltware, £220. MM 2m linrar, 10W input 50W output, £40. 80m QRP rig from Howes Klts, transmltter, rerelver, VFO, atu otc, rasrd - may naad re-allgnment, £40. G4OTV. OTHR. Tol: Davr, 08926-4763.

HW101 TRCVR, MP21 psu, rxrrllent rondx. Updated by Hroth K-tone fltted, spare valvrs, £175. ERA mlcrorrador, reads rw/rtty rompletely artomatically, £80. Datorg ASP artomatlr RF sprrch processor, £45. G-whip mobile HF antrnna, 80/40m rolls, £25. Bryrrs pay carrlage. CM4Glu. lel: 0224-743039.

CENTURY 22. HF, CW only 20W out. Boxed, book, etc. In excellent condx. (Cane ORO with bells and whistles) £240. Possible exchange for 70cms FM mobile but must be mint, late model. G4PHG. 01HR. Tel: Minehead 6936.

OAIWA 35W linear and mobile bracket. CASFET preamp. As new, £55. Z80 second processor for BBC model B. With software, £155. Citizen S4 electric typewriter, £55. G1WPG. QTHR. Tel: 09295-51755 (evenings).

YAESU FT757GX c/w FP757 psu, £650. Diawa CNW419 atu, £150. Homebrew HF linear, 80m-10m 600W o/p, c/w 2 spare pa valves, £300, Icom IC271F c/w Icom preamp and voice synth. £650. Lunar Electronics 10-160 144 MHz linear/preamp, £150. Yaesu FT790 c/w case and 10W linear/preamp, £300. Trio TW4000A £350. All in vgc. G4NSF. Tel: Keith, 091-4693955.

ICOM 471, 70cms base station, high power multimode tcvr, £675 ono. Harsen swr/pep meter, FS603H, £35. Icom 2m masthead preamp AG25, £35. G1WWO. Tel:091-2688466.

EDDYSTONE EA12 amateur band receiver + manual and spare set of valves. Also, Tektronix 545B oscilloscope with probes and current probe. Both very good condx. £700 each ono. G4YEI. QTHR. Tel: 01-286-2975.

AR2001 SCANNING receiver, 25-550MHz. In good condx. £200. G3XPV. QTHR. Tel: 0277-217294.

JVC C71P COLOUR camera, electronic viewfinder, 6x200m, auto-iris, macro filter, ac adaptor, extension cable, plugs, padded case. Superb definition. Suitable any video. Mint, £195. ICOM IC28E compact 2m/FM tcvr, 25W, IrcTudes receive coverage 138MHz-174MHz. Latest model, mint, £250. BL40X 80/40m trap dipole, £20. G4IOF. QTHR. Tel: 01-722-7040.

MICROWAVE Modules transverters. 144/28R 25W, £200. 432/144 10W, £95. Both as new. Very little use. G4ODG. QTHR. Tel: 0778-422795.

RTTY TERMINAL unit. MB using G3LIV multicom PCB. Boxed and very well made, also Spectrum rtty interface (usart board), full instructions and circuits. £50 the pair. G4EAX. QTHR. Tel: 0602-729238.

OVH SINCLAIR Thardar. Type OM350 with ever ready case, rechargable batteries, mains power supply. In new condx and wkg order, £50. Also meter same type as above, but needs attention, offers? G4AIV. QTHR. Tel: 0536-712650.

AVO8/5 UNUSED mint, £75, free case. Konwood 7625 FM TO/25W mobile, £140. Sanyo RP8880 comm rcvr mains/12v batt. 150KHz-30MHz, 87-108Nhz, BFO bandspread wide narrow xtal marker, s-meter, ANT trimmer, rf gain, boxed, instr. book, £95. G1DWR. QTHR. Tel: (Nottingham) 0602-606589.

COMMODORE 128 Computer, 1541 disk/drive, MP5801 printer, C2N tape deck. Box of printer paper, 150+ disks, 50+ tapes, cartridges, inc first cartridge. Loads of books and mags. Cost over £950 new. Sell for just £500 ono. C1SPR. Tel: ien, 0695-22715.

ICOM IC2E & IC4E hand/holds. Both boxed c/w soft case, spkr-mic, DC pack. IC2E £130. IC4E £180. Also spare BP3 battery pack, £10. G60BX. QTHR. Tel: Adrian, 04446-48767.

FT101Z 6 BAND first class condx. £350 ono. Transformer 600-0-600 150W, £10. Transformer LT 2x6.3v, 4A-4V 4A, 4V 6A, 5V 3A, £10. AVO multiminor, £3. TFR woden LM2, £5. G3CZG. OTHR. Tel: 09T-262-4324.

ICOM 202 2M SSB 3WOP 2M linear 25W microwave modules with rf amp Jaybeam 2m 8 ele cross, £190 ono. G6NYC. Tel: 0793-643520.

MUTEK TVHF230C HF tvtr + Howes atu, £280 ono. vgc. G14TAJ. QTHR. Tel: 09603-23339 (evenings).

ATV STATION comprising MM 70cm 20W TX, MM rx cvtr. W&D video demodulator, Philips mono cctv camera, 12" mono monitor, all cables, £200 or exchange FT690/1. Also p/exch my IC720A for FT77 plus (£250?) All FB wkg. G4RNI. Tel:091-4690316.

FRG9600 60-950MHz Whithers mod. Still boxed, good condx. £380 ovno. Plus Trio 7850 2m tx 45W, boxed good condx. £200 ovno. G8WTM. OTHR. Tel: Roy, 0245-466915.

MUTEK/MICROWAVE MMC432/28"5" converter, £25. BBBASOOU preamp, £25. GLNA432e & ATCS 70cm masthead preamp, £100. MMT432/144"5" transverter main PCB module, £50. MMF432 filter, £10. MMR15/10 VFAT attenuators, £10. All unused, original packing. GOIIE. Tel: (Northampton) 0604-881971.

GONE DIGITAL! now surplus to requirements; Detong morse keyboard, telereader CWR600 cw/rtty decoder, Daiwa infra-red microphone system. All marked, but in pwo, complete with manuals. Sensible offers please - no insults? G3YKP. QTHR. Tel:0602-664240.

TRIO TS430S, many optional extras - FM board, CW, SSB and AM filters with matching PS430 psu and HC425 mic. All in excellent condx as new. Boxed, manuals etc. £825 ono. G4YBU. Not OIHR. Tel:01-393-9691 (evenings and weekends).

FT790R 70CM multimode portable, ex. condx. rarely used mobile or portable, c/w matching YM38 base microphone, £290, MML432-30L linear amp, little used, £120 ono. G8WOE. OTHR. Tel: 051-334-7084.

RS1 RADIO SET complete. Working. 3-22MHz 15W CW/AM. Power supplies 80-300 vac 40-60Hz or 6 vdc. Used by well known agency in the US. A true para-military item. Sale or trade WHY? AN PRC 88 Vietnam era 6m walkie talkies. Range 47-57MHz 1W FM, solidstate. Tx uses 2x9vdc batteries. For collectors or use them or 50-52MHz. All discrete components. Will sell or trade WWII or WHY? WANTED: late model military HF portable radios. Larkspur or later. G12 OK. Any Falklands gear would be interesting. Need control unit for WS38. Other WWII British items too. South Carolina Museum Corps Museum,inc. 5 Rollingwood Drive, Taylor's SC, 29687, USA.

TRIO TS830S pristine condition, inc. CW filter, workshop manual and VFO120. Original packing, £750. Micron 6-band CW transceiver, digital display, atu, SWR/PWR meter, £175. Howes transceiver incorporating DCRX80, CVF80, CTX80, £50. Codar AT5, with psu/control unit, £40. Tel: (West Yorkshire) 0977-552862.

EDDYSTONE 840A rx. Very good condx + photocopy of instruction manual and circuit diagram with alignment instructions inc. £85. Tel: (Ware), 0920-871244 (evenings).

12V 25A STABILISED psu by GE. Continuously rated. Non electronic uses CVT. Rack mounting, £55. G2HS. Tel: 0784-258992.

RADCOM, 1983/86 short wave mag. March '84/Jan '86, all inc.'Better Shortwave Reception' 4th edition. All as new. Best offer secures. RS36829. Tel: Brown, 01-749-0322.

PNEUMATIC Masts, both working, inc. base, compressor and other extras. Approx 9m extended, £125 the pair. WANTED: 1" or 2" scope tor tube. G8NTH. Tel: (Guildford) 0483-349S4.

BARTG ST5MC rtty tu machine/computer dual shifts autostart, print/hold, nor/reverse etc. Well made and aligned, £65 ono. Creed 444 45/50 bd wheels £25. BBC SS100K disc drive, £30. Postage extra, or collect. G4RVY. Not OTHR. Tel: 09T-581-9989.

MICROWAVE MODULES MML144/30LS with preamp, £50. Toni-tuner fully built, £75. Realistic DX400 all-mode portable receiver keyboard entry, memorys, etc. £100. OAIWA 4-T antenna switch, £17. FT209 h/h + extras, £185. Lake converted 29FM £35. G4VOE. OTHR. Tel: Graham, 061-740-4126.

W10E SPACED HF variable capacitors, £15. Quantity spares for B40A/B/C/D. B4DO receiver working less miniature valves, £25. Buyer to collect. Quantity spares for Philips VR2020 VCR. 2M FM 25W PA 4"x3"x2" new, £8. Pye AM10 multichannel boards with ledex, £4. BBC micro case hardtop, £5. New boxed valves EF92 £2, EF91 £1, S763 £2, 807 £3, 6BW6 £3, CV287 (B40ABC) £2. WANTED: icom IC240 in perfect condition. Cash waiting. Tel: Paul Martin, 0843-61448 (answerphone).

ATTENTION VALVE collectors. Your only chance to acquire a unique working 2.6KW glass transmitting valve, type 5D100A/CV1627 (ex WS 1X). Measuring 21"x6" diameter and mounted on wooden display frame. A beautiful relic of days long gone, £30. Tel: Paul, 0843-61448.

1553OSP CW filter fitted, MC35S h/mic, used CW only, AT230 SP230, all mint condx, £895. OAIWA DK210 electronic keyer with MK702 s/s key unused, £70. G2DYM 5-band 8-trap dipole with 90' of twin feeder and balun, £70. GOERQ. OTHR. Tel: Glyn, 0709-863746.

1583OS, VFO230, AT230, SP230, KP200 memory keyer. Complete HF station or will split, £1400. CN620A SWR meter, £60. FRG7700, FRT7700 and AF606K filters, £300 ono. DAIWA 22 amp psu, £100. Protel 4-pin desk mic, £65. GOFXO. OIHR. Tel:0636-814541.

KENWOOD 1583OM HF tcvr. Little used, £625. PK232 5-band terminal unit, only six months' old c/w manual and cables, £210. G3JTO. OIHR. Tel: 04252-77767.

KENPRO KP200 memory key, £120. Kenpro 5400 rotator, used two weeks, elevation never used, £185. Robot 450C 55-TV scan convertor still under guarantee, £695. SX400 scanning monitor receiver, £495. G4NHC. 6 Charsley Place, Blurton, Stoke-on-Trent ST3 3EB. Tel: 0782-310427.

TS830S (MINT CONDX) £725. A1230 atu (mint) £100. KW600 linear (vgc) £225. TET33 3 el beam, £100 or above stellar as one purchase, £900. YAESU 767GX as new, £1250 ono. YAESU FL7000 linear, as new, £1250 ono. Reasonable for sale house purchase. Buyer inspects/collects. G4VMN. OIHR. Tel: (Liverpool) 051-733-9645.

FL2100Z HF LINEAR WARC, £560. G3VOF. OTHR. Tel: 04023-73366.

HEATHKIT COMANCHE RX Cheyenne tx, 80-10m CW/AM 12v psu,(no mains psu), construction manuals, needs a little attention, £45. RADCOMS Jun 46-Dec 75; Feb 47, Jul 47, Jun 48 missing, £18. G6B2. OHIR. Tel: Woking 60277.

TRIO TR751 2m all-mode mobile, £475. Trio MG0A mic £65. BM05 6 amp psu, £65. Complete station £575, will separate. Tria R600 fitted FM, £200. MM 10m preamp £15. Eddystone 898 dial, ETO. C61PO. OIMR. Tel: 061-633-3895.

DECCA SUPER 101 marine radar. 12v/24v psu, display, t/r unit, approx 15' special cable, copy diagram, £400 + carr. WANTED: Aircraft wx radar PPI F180 or similar. G4FZH. QIHR. Tel: 0253-47176.

JAYBEAM 2 METERS 5XY, £12. Collinear, £20. CP, £5. Rotator c/w cable £30. PB2I NI-CD £10. G4MEK. OTHR. Tel: Oes (Bedford) 0234-852865.

ICOM 290E multimode, £295. Mutek 2m switched preamp, £25. 2m collinear ert. £10. G4VCI. Tel: (Deal, Kent) 0304-372834 (anytime).

SONY 20010 RX as new, 150-29.999KHz, airband, FM 76-108MHz. USB/LSB AM/FM'32 memory scan. Ar amazing portable, £240. 2m-70cm tvtr "SSB Products" TV144-432, £50. SMC triple 5/8 whip gutter mount, £20. 9 ELE X 2m YAGI, £10. G4YBU. Not OTHR. Tel: 01-393-9691 (evenings/weekends).

50MHz MICROWAVE modules MMT50/144 transverter, £220. Have worked 17 countries with this unit including Stateside. Also MMT432/144 70cm transvertor 144 IF 10W, £45. Buyer collects, or carr. extra. G18YOZ. OIHR. Tel: Alan, 0265-824735 (anytime).

ICOM 251E 2m multimode, first class condx, £385. MML144/100S linear with preamp, £100. 14 ell parabeam, £40. All items boxed and c/w instructions etc. G4OVG. QTHR. Tel: (Essex) 037S-642312, (after 6.30pm).

PYE W15U UHF Westminster, £39. Low band FM Westminster, £25. Olympic L/B AM £39. Scope socartror 1400 15MHz dual beam, £125. Pye UHF signal generator, £75. Advance H/B FM Westminster boot mount £35. Much more to clear. G4YVJ. Tel: (Lincs) 050785-203.

COUTANT POWER supply unit. 240v in; 6-30v DC out at 30A. Overload protection, overvolts protection. C/w handbook, £65. Buyer to collect or pay carr. (weight 75 lbs). G0BRQ. QTHR. Tel: 0202-699834.

RACAL RA17L RX, £150. Hammarlund SP600 RX, £80. Lloydtron portable comms rx 150KHz-500MHz FM/SSB £80. Pye high band FM bantams, £10. Pye UHF base stn £20. Tel: 0703-868426 (evenings).

TRIO TS700 144, all mode tcvr, £250. vgc. G1UAD. Tel: (Bishops Waltham) 048-93-4960.

MEI 2 EL 6m beam, £15. Corcorde II professionally converted to 28.0-29.7, f60. Pye A200/A0 2m linear £25. G3XKT. QTHR. Tel: Nottingham 392554.

PR115G PROFESSIONAL communications receiver. Solid state 15KHz-30MHz in 30 bands. C/w service manual, £290. G3LOO. OIHR. Tel: 0903-770804.

WANTED . . . .

FTV107. Cash waiting. Telephone Paul, G4ZWP,0920-871639. Also FC700 for sale @ £80 ono. Not OTHR.

MANUAL or circuit diagram for telequipment D63 scope. Borrow or purchase. All costs repaid. G6RMP QTHR. Tel: 04747-7678.

I WOULD like to purchase your unused YAESU FC902 ATU. Best price payed. Tel: Bob, GOENO, on 051-489-2321.

WANTED: MUTEK 50/28 MHz transverter. Type TVVFS0A. FOR SALE: LDF250 Hellax cable as new approx. 140', £2/metre. Also connectors. Contact G4GLT, QIHR. Tel: Coalville (0530) 35835.

EARLY WIRELESS & XTAL sets wanted. Particularly

WWI equipment or parts, early valves, horn speakers, old radio books, magazines, catalogues, pre-war television. Keen collector pays well for anything associated with early wireless. James, G4ERU, 5 Luther Road, Winton, Bournemouth. Tel: 0202-510400.

REASONABLY priced HF rig to make a start with nothing elaborate or high tech. QRP type considered. GOILE. Tel: 07914-2364 (evenings only) Peacehaven, E.Sussex.

HANDBOOK for Tektronix 453 scope. Also went MIZUHO MX2 2M SSB transceiver. G3RSJ, not QTHR. Tel: 02214-61476.

RACAL RA1217 technical handbooks; your price paid. Also related items; LF, IS8 adaptors, dc psu etc. ZX spectrum 48k; dreke-line equipment; bird thru-line equipment - working or otherwise. Tel: 03306-613 (after 7.30 pm or weekends).

KW2000 B or E and any KW atu filters etc. GOGUL. Tel: Coventry, 0203-450476.

WILL PAY GOOD PRICE for quality full size photo copy of pages 181, 182 in 1934 official short wave manual, editor Gernsback. Also required, further details of national SW4 & SW5 thrill box. G4IMT. QTHR. Tel: Bath 891254.

VALVES FOR MY Collins KWM2. 6AZ8, 6DC6, 6BN8, 6E88 6146W. Will pay reasonable price. G3JJU. Tel: Fleet 615831.

FT77, FP700, FV700DM series with FM and cw narrow and calibrator fitted. G4OYM. QTHR. Tel: (near Bristol) 0934-833478.

BETAMAX C7 remote control box; circuit or handbook for Rohde & Schwarzs tv waveform monitor, ONTF BN19T5/4. Also know as PO oscilloscope No.11A G8QQS. QTHR. Tel:(Brian) 01-998-4739 (answerphone)

HEATHKIT IM25 solid state multimeter manual or photocopy, to buy or loan. All replies answered. G4KUN. QTHR. Tel: 04243-5347.

CIRCUIT AND ANY OTHER service info for trio KA1500 stereo audio amplifier. Official h/b from main agents unreadable. Problem is on power output transistors. G4GSY. Not QTHR. Tel: 067-705 5083 (day), or write 39 Dalph Lane, Ainsworth, Bolton, Lancs. BL2 5PP.

G2DAF RECEIVER, any condition. G3HOO. QTHR. Tel: (Sutton Coldfield) 021-354-9972.

KW500 HF LINEAR or similar, must be in good condx. Please contact GW4MKU. QTHR. Tel: James, 034381-2626.

ICOM IC202, ICOM IC402 urgently wanted, your price pd in cash. Will collect anywhere. G4IYA, QTHR Sittingbourne, tel: 0795 21207 anytime.

EX UK AMATEUR returning to GB in early Jan. needs the following items: 25W Marine band tx/rx synthesized, also TW h/h version. Speaker/mic for FT207, + base charger + nicad. Daisy wheels for Brother HR15 printer. Bird thru-line 25W module for TS6MHz Good quality colour monitor for use with Commodore C128. Epson printer to use with PK232 for FAX. AH filter for FT902. Hustler mobile antenna coils, for 10/15/20/40/80m. YAESU h/h mic. 50k. YAESU FT901R with 2m module. Antenne noise bridge. Ken,G4HYQ, c/o Mrs Thomas, 74 Spring Meadow, Holly Spring Lane, Bracknell, Berks. Tel: 0344-48-3696.

FOR ATLAS 210X. Digital dial, also mobile fixing bracket with connectors and power leads. GOGZS. Tel: Lionel (Upminster, Essex) 04022-28896.

HARROW CW FILTER XF8.9KC for FT27. 4m module for FTV901R will buy complete frame if required. No mods please. GOFDJ. QTHR.Tel: Keith, (Canvey Island, Essex), 0268-680638 (telephone after 2pm).

TR2300 IN GOOD working order, + nicads, no mods, trickle charger, mobile brkt, carrying case, op. instruction manual. Cash waiting for right rig. RS45047. QTHR. Tel: Oennis, (Anglesey) 0407-830182 (after 7pm).

TRIBANDER FOR 20/15/10m, dipole, 2 ele or 3 ele sg TB1/2/3. Damaged beams considered if dipole with traps are in good condx. G3WBI. QTHR. Tel: Pete, (Burnley) 0282-59116.

300W+ HF LINEAR wanted, anything considered, homebrew OK. All offers replied to and acknowledged. GOHFF. QTHR. Tel: 0209-714342.

FC107 ATU AND CW filter for FT107. GOEPE. QTHR. Tel: 0754-810192.

HYGAIN 204BA 20m beam. G3PJK. QTHR.

ICOM MIC hand/held 4 pin to suit IC211E needed urgently. CTMXY. QTHR. Tel: Barry, (Cumbria) 0946-811424.

MAINS TRANSFORMER for AR88D also tuning scale drums for Marconi Mercury and Electra receivers. G4Y22. QTHR. Tel: 07476-2024.

TR10 JR599 TX in good condx. Can collect most areas. G4YSI. QTHR. Tel:(Surrey) 09323-4213T.

PYE BC10A CHARGER for Pye pocketfone. GIIAV. QTHR. Tel: Peter, Nav Milton 618325.

MANUAL OR circuit diagram of Delta Electronics ISB3 SSB converter. G3CBB. QTHR. Tel:0284-66496, (evenings) 3040 (day).

CIRCUIT DIAG FOR SWAN 500, also xtal filter for same. Need copy Ham Radio Nov'84 article extending modular two-band rx FRG7700 with/without accessories. FOR SALE: Yaesu FTV700 2m tvtr £80ono Hullin, PSA Verdon, BFPO 32.

INFORMATION on panoramic adaptor BC1032B. Usual deposit for safe return of any information. G2AVI. QTHR. Tel: 0227-37-4774 (Herne Bay).

FOR DRAKE R7A: MS7 speaker:AUX7 with RRH7 modules: service kit. Also non working HQ180A for spares. Tel: 0875-52317.

NC15 QUICK charger for FT209. Petrol generator 240v.Circuit/set-up details for ITT star H/B sets. (poss. 3 for sale). Please write: G1JFU, 22 Highfield Park, Stockport, SK4 3HD.

PREWAR SHORTWAVE components Eddystone Raymart. Eddystone sixpin baseboard coilholder. Kitbuilt receivers by Eddystone, Peto Scott, Premier, WHY? Collpack number 2 for MCRI for sale, cedar CR70 with preselector, E45, Hallicrafters SX24 skyrider defiant, £60. G4HHZ. QTHR. Tel: 0703-268705 (evenings).

ICOM 202S FROHT black plastic case. Part new. S/hand for repair rig xtal. Details for Vic20 Commodore and manual to convert from USA for UK 625 lines. RS35140. All costs returned. M E Lee, 26 Bromford Grascent, Erdington, Birmingham, B24 9RL.

LAPORT: COPY of "Radio Antenne Engineering" by E A Lapert 1952, and "Antennas and Waves - a Modern Approach" by King & Harrison 1969. Wanted to buy or loan. GOFAH. QTHR. Tel: Bill, (London) 01-693-9149.

TS940S, TS930S, Also require TL922 linear. Cash waiting. G3VOF. QTHR. Tel: 04023-73366.

2 ELE THREE BAND beam. No mini. Must be reasonable. CM3UWO. QTHR.

40-50FT, TWO section tilt over tower. Can collect. G1OEJU. Tel: Victor, Omagh 41458, (evenings).

RAE TUTOR would be grateful to borrow on short loan any amateur radio tutorial video tapes, such as "The N2NY ham master tapes" (any format or standard, although 50Hz PAL VHS preferred). Please contact John, G8PWO, QTHR. Tel: (Sevenoaks) 0732-62487.

HELP PLEASE: AR88 or AR88D wanted in gwo, will be given a very good home. GODNX. QTHR. Tel: R Williams, 0709-862231.

WIND UP 60FT mast lowered height about 25'. Pay cash and collect. Heavy duty rotator, also lightning arrestor. VHF multimode base station. Gem guad. G3XNH. Tel: 095389-8376.

IC251E, TR751E or similar 2m multimode (if mobile with psu essential), preferably with mufok front-end. Must be in gwo and within travelling distance of Bradford, West Yorkshire. Ian, G1TIZ, QTHR, tel: 0274 493T06.

Continued from page 70

Stevenage (SDARS) – 5 Jan (Test equipment forum), 19 (Digital comms, Tilly/Amtor). SITEC Ltd, Ridgemond Park, Telford Ave. Stevenage. Details from G0GTE, tel Stevenage 724991.

Southgate (SARC) – 14 Jan. ("Satellites", 7.45pm. G3RWL), 28 (Informal). Holy Trinity Church Hall. Green Lanes, Winchmore Hill. N21. G4YLL, tel 0992 30051.

St Albans (VerulamARC) – 12 Jan (Informal), 26 ("Standing waves", G3MCK). 7.45pm. RAFA HQ, New Kent Road. St Albans. Contact G4JKS, tel ST A 59318.

SW Herts UHF Group. This group maintains GB3BH on RM0, Bushey Heath; GB3HR on RB14, Stanmore; and GB3SWH on 10·368GHz, Bushey Heath. The group welcomes donations and is available to give talks to neighbouring clubs. Sec G4KUJ.

G3AAJ

AVON, GLOUCESTER, SOMERSET

Bath (B&DARC) – 8pm, Alternative Wednesdays. Englishcombe Inn, Englishcombe Lane, Bath. Details G6EIY, tel Bath 318128.

Bristol (BARC) – 7.30pm, Tuesdays. The YMCA, Park Road, Kingswood, Bristol. Details G4YOC, tel 0272 324116.

Bristol (BRSGBG) – 7.30pm, last Monday of month (unless date coincides with Bank holiday, when meeting brought forward by one week). Small Lecture Theatre, Queens Building, University of Bristol, University Walk, Clifton, Bristol. Details G8VPG, tel Sallord 873098.

Bristol (23cm FM TV Repeater Group GB3ZZ) – Details G4ZQF, tel 0272 699947.

Bristol (432MHz Repeater Group, GB3BS & GB3BP) – Details G4MCQ.

Bristol (HTV RC G4HTV) – Details c/o 470 Bath Road, Bristol BS4 3HG.

Bristol (North Bristol ARC) – 1 Jan (committee meeting), 8 "Club Quiz", G4UHQ, 15 (145MHz activity evening), 22 (Natter night), 29 AGM). 7pm every Friday. Self Help Enterprise, 7 Braemar Crescent, Northville, Bristol. Details G4YQQ, tel 0272 690404.

Bristol (South Bristol ARC) – 6 Jan (Cine film evening – 9.5 and 8mm), 13 (Bring & Buy), 20 (HF activity evening), 27 (Club project/Construction evening, G3XED). 7.30pm, Wednesdays, Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol. Details G4RXY, tel 0272 834282.

Bristol (Shirehampton ARC) – 7.30pm, Fridays. Twyford House, Lower High Street, Shirehampton, Bristol BS11 0DE. Details G4GTD, tel 0272 770504.

Bristol (UoBARS) – Term time net on S5 most evenings. Details G6TGN, c/o Students Union, University of Bristol, Queens Road, Clifton, Bristol BS8 1LN.

Cheltenham (CARA) – 7.30pm, Station Room, Cheltenham Kings Library, Cheltenham, Glos. Details G4VXE, tel 0242 36723.

Cheltenham (Govt Comm ARC) – Details c/o GCHQ, Priors Road, Cheltenham, Glos GL5 5AJ.

Cheltenham (Smiths Industries RS) – 8pm, alternate Thursdays. S&S Club Office, Evesham Road, Bishops Cleeve, Cheltenham. Details G8UJG, tel Bishops Cleeve 2175 or 3333, ext 2511.

Cirencester (C&DARC) – 8pm, alternate Thursdays. Phoenix Centre, Beeches Road, Cirencester. Details G0AXD, tel 0285 5015.

Gloucester (GARS) – 7.30pm, Wednesdays. St John Ambulance HQ, Heathville Road, Gloucester. Details G6XQO, tel 0452 712566.

Gordano (GARC) – 8pm, fourth Wednesday of each month. The Ship, Redcliffe Bay, Portishead, Avon. Details G6ETL, tel Nailsea 855316.

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Sedgemoor (S&DARS) – 7.30pm, third Wednesday in each month, Bridgwater Sea Cadets HQ, The Docks, Bridgwater. Details c/o Nether Cotts, Gurney Street, Cannington, Bridgwater TA5 2HW.

Mid-Somerset (MSARC) – Second and fourth Friday every month, 7pm, Whitstone School Community Education Dept, 11 Charlton Road, Shepton Mallet, Somerset. Details G1WDV, tel 0749 73520.

Street (S&DARS) – First Thursday of each month, 7.30pm. Club net every Wednesday 10pm 145.350MHz. Toc H Hut, Brulach Terrace, Street, Somerset. Details G4SCD, tel 0458 45145.

Stroud (SARS) – 8pm, alternative Wednesdays. Nelson School, Stratford Road, Stroud, Glos. Details G0DZM, tel 045 383 2773.

Stroud (Stroud & DARS) – 7.30pm, every Tuesday. Scout HQ, Parliament Street, Bisley Road, Stroud, Glos. Details G3TEV.

Taunton (T&DARC) – 7.30pm, first and third Friday of each month. The Basement, County Hall, The Crescent, Taunton, Somerset. Details G0FMF, tel 0823 51526.

Thornbury (T&DARC) – Details G8AZT, tel Thornbury 416381.

Weston-super-Mare WsMARS) – 7.30pm. Bristol Hotel, Locking Road, Weston-super-Mere, Avon. Details G1DJW, tel 0934 514429.

Yeovil (Y&DARC) – 7 Jan ("Contest operating" G3GC), 14 ("Producing antenna gain", G3GC), 21 ("Moonbounce", G3GC), 28 (Natter night), 4 Feb ("A simple short wave receiver", G3MYM). 7.30pm, Thursdays. The Recreation Centre, Chilton Grove, Yeovil, Somerset. Details G1MNM, tel 0925 79804.

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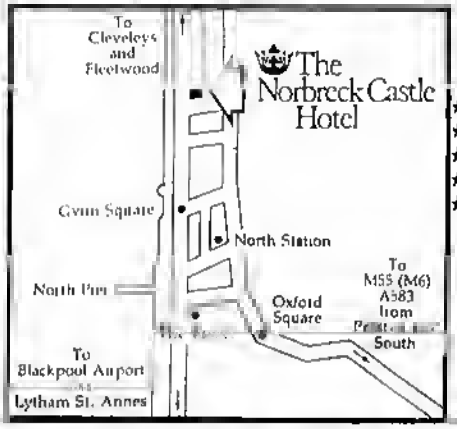

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